TANDY LAPTOP COMPUTING JANUARY 1989

TERRY KEPNER'S

portable 100

$3.95/CAN $4.95

Happy Anniversary!

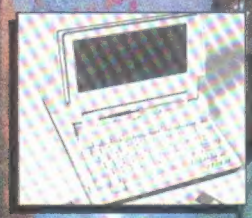
Still crazy after all this year

Easy Turn-Ons

Control external devices.

GoldText...

bytes off more than *TEXT* can chew.



A Day at the Races

Horsing around with your portable.

Scarney 3000

An addictive dice game.

More free programs and a contest inside!

74724 01 0 186036 8

Finally . . .

An 8 Oz. Coat-Pocket PC!

The WIZARD by Sharp Electronics

Traveling Software was asked by Sharp Electronics to develop the WIZARD PC-Link and the Time/Expense Manager application card for the WIZARD. Since we developed those items we will support them and the WIZARD completely. Our trained technicians are just a phone call away to make it even easier to use this breakthrough 8 Oz. PC!

WIZARD is the ultimate electronic organizer with built-in functions to save you time. More powerful than the original IBM PC, it is also a full functioned computer. The WIZARD uses state of the art IC RAM cards for its applications programs. With the RAM/ROM cards and its own memory, WIZARD puts 256K of power at your disposal. Its eight line LCD display makes scrolling almost unneccessary.

Our Time/Expense Manager facilitates quick entry of all expense items and enables you to track time for billing of clients. Back in the office use the WIZARD PC-Link to transfer this information into Lotus, Dbase, or other PC applications.

FEATURES

128K ROM software built-in
Large Display: 16 characters × 8 lines, convertible to 10 characters × 4 lines for easy reading.
Easy to use keys: Full alpha keyboard with separate numeric keys.
32K memory — with cards up to 256K of RAM and ROM
Secret function that protects your data from being read by an unauthorized person.

7 built in functions:
Calendar: monthly, weekly and daily calendar for up to year 2099. Marks the dates that you have appointments.
Sidekick files can be downloaded using WIZARD PC-Link!
Telephone: Allows you to store up to 600 names, office numbers, home numbers, fax numbers, addresses, and other information. View up to 8 lines at a time.
Download your Dbase or Sidekick phone list!
Memo: Allows you to store up to 70 pages of information.
Upload your memos into your favorite word processor!
Local/World Time: displays in both 24 hour and 12 hour format. You can select any city in the world as reference, and the WIZARD will tell you the local time in that city.
Card: The optional software IC cards will turn the WIZARD into the tool you need:
— Thesaurus/Dictionary with up to 87,000 words
— 8 Language Translator
— Time/Expense Manager
Schedule: Daily and weekly appointments.
You'll never miss one with Wizard's audible alarm.
Calculator: 3-Key memory and paperless printer
Put in formulas and do "What ifs".

WIZARD PC-LINK

Data Transfer: Sends and receives files between the Wizard and your PC.
Data Conversion: Converts data received from the Wizard into several different file formats (including Lotus and Side Kick) and printed reports.
Data Creation: Wizard PC-Link allows you to enter data for use with the Address, Schedule, and Memo programs on the Wizard and to store the new information in a file on the P.C.

TIME EXPENSE MANAGER

To Do List Manager: A flexible tool for managing tasks.
Sort and view To Do Lists records by deadline, manager name, task priority or project name.
Expense Manager: An easy to use method of tracking expense information for the traveling business person. Quickly enter expenses. Reporting options allow you to see total expenses by expense or payment type in categories you define.
Time Accounting: Track time spent on tasks. Can be categorized as billable or nonbillable. Time individual activities to obtain an accurate record of the time spent on each task.
View total time spent by client or by task.
Note: Both Time and Expense information can be converted directly into a Lotus spreadsheet using Wizard PC-Link.
(Includes 32K RAM on card for data.)

WIZARD Order # AC-WI-01 **$299.00**
WIZARD PC-Link Order # AC-WI-02 **Call**
TIME/EXPENSE MANAGER ROM/RAM Card
Order # AC-WI-03 **$119.00**
WIZARD, WIZARD PC-LINK, TIME/EXPENSE MGR combo
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Traveling Software

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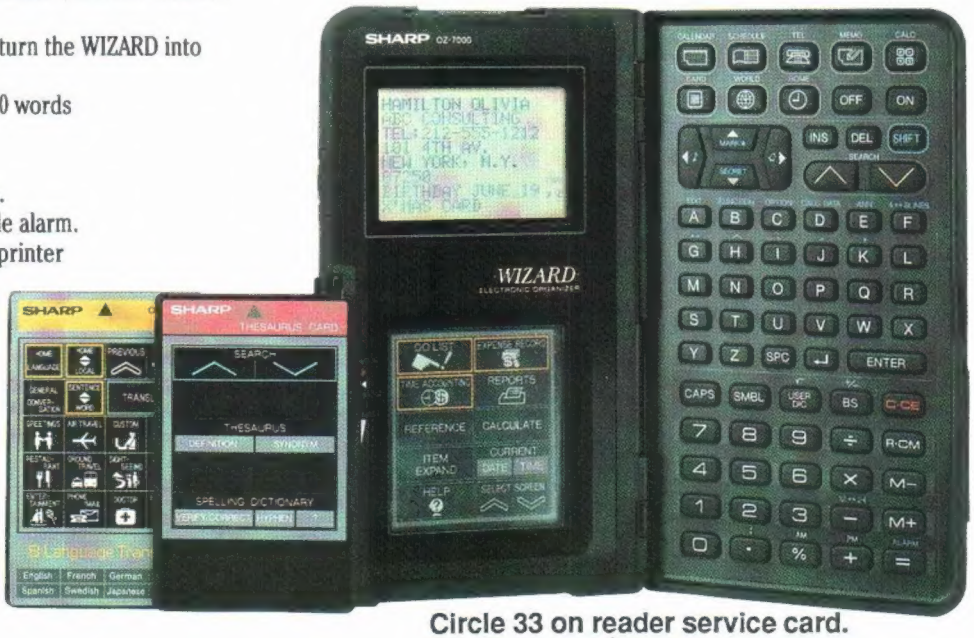
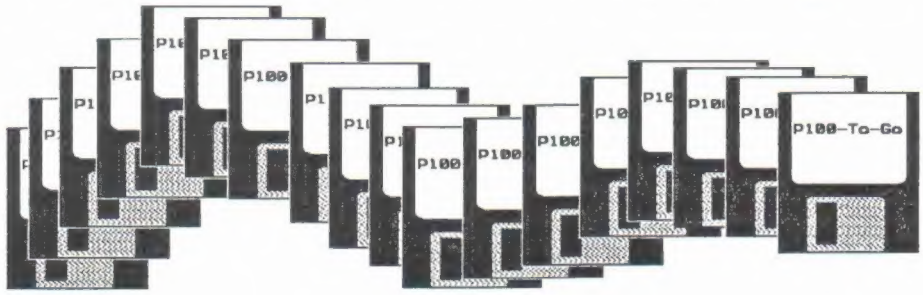


Circle 33 on reader service card.

FINGERS TIRED?

Accomplish more... in less time.
Get the P100-To-Go monthly program disk.



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We make it easy and inexpensive. You deserve value. At *Portable 100* we believe in value. That's why we're not only making each month's programs available on 100K Tandy Portable Disk Drive disks, we're also making sure any extra room on each disk is packed with interesting and fun bonus programs. All files are in *.DO* format. Ready to load. Ready to go.

Not just for the Tandy 100. The *P100-To-Go* disks will work with any computer that uses the Tandy Portable Disk Drive, the Brother FB100, and the Purple Computing Portable Disk Drive. This means your NEC-8201/8300, Tandy 100/102, Tandy 200, Olivetti M10, and Kyotronic KC-85 can all load these programs into memory (once loaded, changes for specific computer models may be required, refer to corresponding program article for information about compatibility with particular computers).

Subscribe and save! You can order *P100-To-Go* disks individually at only $9.95, but for maximum savings sign up for our **Six-pack Special**, one disk each month for six months, six disks, for only $47.70. Save over **30%**, a savings of **$2.00** per disk.

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SIGNATURE _____

NAME _____

STREET ADDRESS _____

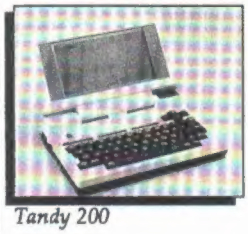
CITY _____ STATE _____ ZIP _____

Mail to: Portable 100, P100-To-Go,
P.O. Box 428, Peterborough, NH 03458-0428

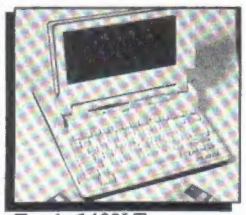
VOL. 6, NO. 1
January 1989

ON THE COVER:
In celebration of our first year, we'll give a free year's subscription to the reader who can match the faces to the names on the masthead. (A drawing will be held January 31, 1989, if there's more than one correct entry.) Mail to: P100, Contest, POB 428, Peterborough, NH 03458.
Photo by Richard Brayshaw.
Concept by Shauna Crowley and Carrie Hebert.


Tandy 102


Tandy 200


Tandy 600


Tandy 1400LT

ROM WITH A VIEW

Happy Anniversary to us! This issue marks the first anniversary of the "new" *Portable 100*, marking Portable Computing International's first year publishing *Portable 100*. Thus, the party on our cover. We've come a long way (baby!) with your support and encouragement. Happy anniversary to YOU, too!

I hope your Christmas was wonderful. And if you took my suggestion to hug someone special, I hope it made their day. (If so, why not do it again?)

Great news: Look who's still in the magazine! Traveling Software is staying in our pages after all, so you'll continue to see their great products for your computer. We'll be reviewing some, and of course we have reviewed many in back issues. I'm eager to try their new *Wizard* (a 2-megabyte handheld that connects with a PC) with my 1400LT. There's no *WIZ100* so far, but I'm checking into it. If necessary, I'll hassle 'em until they make one, okay? (They're already working on a version of *Battery Watch* for the 1400LT with hard drive, possibly available when you read this.)

A sad/happy note: We're losing one heckuva good team member. Accounting supervisor Carrie Hebert is leaving, but for a happy reason—she's going to have a baby! Thanks for all you've done, Carrie. We'll miss you.

Now, how shall we start 1989? By discussing software copyrights, distribution, and the public domain? This month's *"BASIC* Bits" and Phil Wheeler's letter (*I/O*) should generate some discussion of these issues. Read 'em and see what you think. For now, I'll inject only one thought: Programmers, with just a few *REM* statements, you can make your intentions clear. Please put them in your programs (and documentation) to prevent confusion!

Upcoming: Optical Data Systems is sending us some products for review. Their extensive line of bar code products (some for our little machines) is used by major companies, government agencies, and folks like you and me. We already have Rural Engineering's *Data Acquisition System* in the hands of a knowledgeable reviewer. And King Computer Services' impressive *RBASIC BASIC*-To-ROM compiler has generated a great deal of interest, so we'll have a review of that as well. And much more.

Chasing the Author: I'm reading *Chasing the Glory*, a new book by Michael Parfit, who flew his Cessna around the country, retracing Charles Lindbergh's continental odyssey. Aside from great reading, there's an unusual twist: While flying the plane with his feet, Mike wrote the book on a "Radio Shack laptop computer—a low-power, rudimentary piece of equipment as obsolescent as the plane itself, but just as useful."

I tracked him down, and he's interested in sharing his experiences with you. I'm not sure how we'll go about it yet; he's in Antarctica doing a piece for *Discover* magazine. So just stay tuned ...

Limited supply: The plastic cover on my M100 is one of my most valuable "peripherals." This clear, *hard* PTG plastic cover, fits over the entire face of the 100 and has protected my 'puter from mucho abuse over the years. I called the manufacturer; he's still got about 30 of them around. Sending $22.95 (total) to The Southworth Company, 4001 Hawthorne Ave., Dallas, TX 75219, will get you one.

Note to Boston Computer Society lap-types: Great fun meeting y'all. Thanks for inviting us!

Note to Patricia Heywood: Welcome to our staff! (And prepare for some craziness!)

Note to our readers: Thanks for another great month!

-Nuge

Toolbox

Manuscripts were typed into Microsoft Word 3.0 on a Tandy 1400 LT, where they were edited, spell-checked, and had basic format instructions inserted. From there they were loaded into a Tandy 4000 (80386 CPU, Tandy EGA Monitor, Tandy LP-1000 LaserPrinter) desktop computer and placed into Aldus' IBM PageMaker 2.0a. There they were put into a rough approximation of the magazine's final appearance. Here, pull quotes are placed, headlines, intros, and bylines are sized and positioned, and advertisements positioned.

Next, the magazine was ported over to our Art Director's Macintosh Plus, using the 1400 LT and Mac-link. She then went over the publication using Aldus Macintosh PageMaker 2.0a, making final design decisions on photo, figure, and listing sizes and placements. She precisely placed the text and added all the little things that go into making a nice looking publication.

Page previews were output from her Laserprinter. When everyone was satisfied with the appearance, the Macintosh disk was sent to Colorite Corp. in Wisconsin for final output directly onto photographic paper. The finished magazine was then delivered to the printer, who printed it, labeled it, and mailed it to you.

TERRY KEPNER'S **portable 100**

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SPLITSVILLE

Just finished reading (for the first of many times) the October issue. I think *Portable 100* is a great magazine that is only getting better. I feel very good about that especially after reading your "ROM with a View." I like your attitude, as I have a lot of respect for the Tandy portables. I own a Model 200 and a Model 100. I love them both.

I am especially intrigued by some of the things you are doing on your 100, such as a split-screen *TELCOM*. I am a ham radio operator and am looking for a split screen terminal program to use on packet radio. Please tell me how I can get hold of the one you mentioned!!

Earl N. Oster, Jr. KA5UJC
Beaumont, TX

Easy—just download it! See Phil Wheeler's letter this month.

-MN

SPLITSVILLE II

In the latest issue of *Portable 100*, a story mentions a "split-screen program" by a Mr. Yi. I'm a journalist, and if there's a split-screen program that allows copy to be transferred between text files on the Tandy 200, that would be a godsend. Can you give me any clue as to where I can find that program?

Ken Schachter
Little Neck, NY

Unfortunately, no such thing is available for TEXT. Supera V3.0, *from Ultrasoft Innovations* (Marketplace, *Oct. '88), lets Tandy 100/102's and KC-85's edit two text files at once. No split-screen, though, and no T200 version.*

Here's an idea to make it easier to CUT *and* PASTE *between files. Before leaving one file, type an unusual character* (CODE- *or* GRPH-something). *Upon returning,* F1 *will quickly* Find *this "bookmark" character, putting you right where you left off. Also, see Larry Stammer's letter this month.*

*Now if it's split-*personality *you want, I can provide that!*

-MN

(No he can't.)

-MN

[Yes, he can!]

-Eds

A BETTER ANGLE

In reference to the *TELCOM* dialing string in "Getting Wired" (Nov. '88): Please, no! The angle brackets are not required and should not be used the first time you call a BBS. BBS number listings are often wrong, and you want to be able to talk if a voice answers. If you get a wrong number, even if it's not your fault, apologize (on behalf of BBS'ers in general); then try to fix the listing.

George Mueden
New York, NY

Good point. Here's how to do it. With no angle brackets, the computer hangs up immediately after dialing, so you must physically lift the telephone handset while dialing to prevent that. Then when you hear the other computer's answer tone, press F4 *to enter* Term *mode, place the handset back on the phone, and continue with your session. Having verified that the number is correct, you can use the angle brackets next time.*

But if you hear a voice instead, don't press F4. *Apologize for the wrong number and hang up, courteously sparing the other party an earful of "modemese."*

In trying to make the article simple, I may have oversimplified. George's way is better!

-MN

The angle brackets are not required and should not be used the first time you call a BBS.

TAKIN' CARE OF BUSINESS

Thanks for a great issue, especially N.F. Ireland's two excellent programs, *ENVPTR.BA* and *FORMSR.BA* ("Nat's Naturals," Nov. '88).

ENVPTR.BA was just what I needed for a complete word processing package, with *SCRIPY.CO* and *PRINTC.BA*, to use with a DMP-105 printer. However, for business correspondence it is usually necessary to have four lines for the "Addressee." The modifications on the enclosed listing do just that. (See Listing 1.)

Keep up the good work, and apologies to Mr. Ireland for modifying his program.

Herminio Rodriguez
Bronx, NY

"Well, that's what they're for!" says Nat. "Glad you like 'em!" Note the difference in the use of CHR$(10) *when used with Tandy printers, which supply their own linefeeds, as opposed to the non-Tandy printer for which Nat wrote the original version of* ENVPTR.BA.

-MN

THE *INSIDE* STORY

The article "Weighing the Differences" (Aug. '87) describes differences in the ROM software and operating systems between the Model 100 and Tandy 102.

Your ad for *Inside The Model 100*, by Carl Oppedahl, has prompted me to drop you a note. I gather that this book describes in depth the ROM routines and keyboard scanning.

My Tandy 102 being different in these areas (and perhaps, others?), I hesitate to purchase a book tailored to another model. Can you help?

Mike Vining
FPO Miami, FL

No need to hesitate, Mike. They're about 97 percent compatible, and the software differences are virtually insignificant. In years of 100/102 machine language programming, I've had no problems, relying on both Carl's book and Hidden Powers of the TRS-80 Model 100, *by Christopher Morgan. I wouldn't be without either of them.*

Traveling Software carries Inside, *and Ultrasoft Innovations carries both. Although we've stopped selling books, all the ones we advertised are available from Granite Street Portables, P.O. Box 651, Peterborough, NH 03458-0651. (See their ad in this issue.)*

-MN

PUBLIC DOMAIN?

An article in your November '88 "BASIC Bits" column appears to identify my program, *XMDPW5.BA*, as public domain software. It has not been released as public domain, nor is it likely to be. Let me explain why.

Mr. Quindry correctly describes

XMDPW5 and identifies its original source (*XMD100*, by J.R. Chenoweth). Mr. Chenoweth uploaded *XMD100* to the CompuServe Model 100 Forum and identified it as copyrighted. My contribution has been to package it as a relocatable loader and, through a series of six *XMDPWn* versions, remove a few minor bugs, enhance some user interfaces and add some new features—and then to provide user support in the Model 100 Forum. I created my initial source code by disassembling *XMD100*, and I have added to it by my own devices and by drawing from other code developed by Model 100 Forum members. However, my source code continues to carry Mr. Chenoweth's original copyright notice.

While I, personally, would be perfectly happy to see the *XMDPWn* series released to the public domain, I believe J.R. Chenoweth's copyright to still be in force. My attempts to contact him, by CompuServe Easyplex and by phone, have been unsuccessful. But his silence cannot be interpreted as assent to public domain release; I believe his rights must be respected.

I generally applaud Mr. Quindry's efforts in distributing software, so long as that software is in the public domain; but *XMDPW5.BA* is not public domain. And there is a broader issue. The best place to get that, and any of my other programs, is in the Model 100 Forum. That is where I provide updates and support. For example, there you will find: *XMDPW6*, which supports download to Gold Card and other bus-connected devices; an October 1988 update to *XMDPW5*; autodial/redial programs to support these comm programs; and Tandy 200 versions of each of the above. While this is not a CompuServe project per se, J.R. Chenoweth's program has been enhanced by myself and other members along the lines he suggested, and beyond—with the Model 100 Forum as the mechanism of focusing these individual efforts. The Forum provides a "memory," permitting continued software development and support even though an individual programmer (like Mr. Chenoweth or myself) may leave the Model 100/102/200 ranks. This contribution cannot be matched by any other distribution approach, however laudable in intent.

Phil Wheeler
Torrance, CA

ALL THE NEWS
THAT'S FIT TO PASTE

I'm a staff writer with a major Los Angeles daily newspaper and take my Tandy 200 on assignments with me everywhere. I've upgraded it with two more 24K memory banks and installed the *Sardine/T-Word* chip.

Because of the 24K memory limit in each bank, many of us on the road are forced to type notes in one bank and write the story text in another. We've often been irritated by the inability to move notes from one bank directly to the text in another bank by using the *Select*, *Cut* and *Paste* functions.

"Cross-bank Pasting" (July '88) was just what the doctor ordered. It was easy to install (I used the *BASIC* version), although I kept getting an error message in line 1 that I never did figure out. In any case, the program works beautifully. Pasting from one bank to another is especially handy when working under deadline pressures. The column was worth the price of a year's subscription. Thanks.

An added note: I hope Tandy's announcement that it will no longer make the 200 doesn't in any way diminish your coverage of what I believe to be the most commonly used laptop among professional reporters—the Tandy 200.

Larry Stammer
Los Angeles, CA

You should see Paul Globman's XOS *cross-bank operating system for the T200, with everything you've seen in* Custom 200 *and much more. You can download it from CompuServe.*

And don't worry, Larry, we won't cut back Tandy 200 support.

-MN

I generally applaud Mr. Quindry's efforts in distributing software, so long as that software is in the public domain.

```
15Ø CLS:PRINT@9Ø,"ENTER ADDRESSEE INFO"
16Ø PRINT:LINEINPUT"Name: ";A1
165 LINEINPUT"Name 2: ";A2
17Ø LINEINPUT"Street: ";A3
18Ø LINEINPUT"City, State Zip: ";A4
19Ø L1=LEN(A1):L2=LEN(A2):L3=LEN(A3):L4=
LEN(A4)
2ØØ IFL1=>L2ANDL1=>L3ANDL1=>L4THENQ=L1
21Ø IFL2=>L1ANDL2=>L3ANDL2=>L4THENQ=L2
22Ø IFL3=>L1ANDL3=>L2ANDL2=>L4THENQ=L3
225 IFL4=>L1ANDL4=>L2ANDL4=>L3THENQ=L4
24Ø CLS:PRINT@4Ø,"PRESS <ENTER> WHEN PRI
NTER READY":LINEINPUTR
25Ø LPRINTR1:LPRINTR2:LPRINTR3
26Ø FORN=ØTO4:LPRINTCHR$(1Ø):NEXT
27Ø LPRINTTAB(LT-Q)A1:LPRINTTAB(LT-Q)A2:
LPRINTTAB(LT-Q)A3:LPRINTTAB(LT-Q)A4
```

Listing 1. "Takin' care of business." A modification to N. F. Ireland's ENVPTR.BA *program.*

?IO—CORRECTIONS

Two listings were transposed in "Calling *TEXT* from *BASIC*" (Dec. '88). The code in Listing 3 should appear above the caption for Listing 5, and vice versa. We did it on purpose. Wanted to see if you were paying attention.

-MN

We welcome all letters from our readers, whether critical or complimentary. We print as many letters as space permits (some are edited for space considerations). Address your correspondence to: Portable 100, I/O Dept., P.O. Box 428, Peterborough, NH 03458-0428.

COMPATIBILITY: Tandy 100/102/200, Olivetti M10, Kyocera KC-85

Real-World Control ... One Step at a Time

Today the lamp, tomorrow the world.

by Beverly Howard

Real-world control has an intimidating air about it. This term, labeling the process of using a computer to control external mechanical devices, implies complexity, expensive add-ons and intricate, complicated programming. It doesn't have to be that way with the Model 100. Even beginners can control external devices hooked up to this "wonder computer."

The Model 100 already has the two requisites for this type of control—a real-time clock and an accessible relay—built in. The clock should be familiar to every Model 100 owner, but the relay is hidden in the cassette interface socket. Its contacts were originally designed to start and stop an attached cassette recorder while the computer loads and saves files. And although the relay can switch only a small, low-voltage current, it can nevertheless control a larger external relay, which can, in turn, switch higher voltages and currents.

SETTING UP A RELAY

Even without an external relay circuit, you can still experiment with the principals of control by using a cassette recorder and a Radio Shack cassette-to-computer cable. Hook up only the *REMOTE* (the smallest) connector. Put in a music tape, turn up the volume, and press *PLAY*.

Stopping and starting a cassette may be fun, but you may have in mind more useful devices, which use more power than the relay can handle. So for more power, you can build an external relay circuit. Figure 1 shows a simple circuit that enables the Model 100 to switch 110-volt line current safely. The parts are all available from Radio Shack for $10-25, depending on your scrounging ability and the final configuration of the circuit. You can replace the battery controlling the external relay with any suitable DC power supply. In selecting the capacity of the relay, a rough rule of thumb is that a 100-watt bulb draws about 1 amp of current at 120V. I advise against using any relays that require the Model 100 to switch a voltage greater than 12 volts or a coil current above 200 ma (milliamperes). If you need higher switching capacity, use a small relay to switch another high-capacity relay.

The cassette line should terminate in a 3-pin DIN connector with the two control wires connected to pins 1 and 3. (Because the placement of the pins is standard, you can use either a 3-, 5-, or 8-pin DIN plug.) The Model 100 manual shows the plug layout and pin assignments. You won't have to connect or use any other pins in the cassette port.

You can also use opto-electrical (solid state) relays. These generally cost more but draw little current to control the high-voltage current. But note that they switch the current on and off slowly, which may not be desirable in some applications. One major advantage of an opto-electrical relay is the total isolation of the high- and low-voltage circuits from each other.

TESTING THE CIRCUIT

Once you've completed the circuit, it's time to test it before connecting it to the Model 100. A note of caution: **contact with a 120-volt circuit can be lethal!!!** Unless you're used to working with house current, get help from someone who is. Have him or her check the circuit before plugging it into a wall socket. (One hair-thin, stray strand of wire can reroute enough current to jolt you severely or fry your Model 100.)

After inspection, plug the unit into an outlet and carefully check the voltages on the low-voltage side of your new relay box to assure that it is completely isolated from the 120V portion. Check the voltage between the case and components and ground and confirm that it is zero. If you're using a two-prong, 120V plug, reverse the plug in the wall socket and repeat the tests.

Next, check the operation of the switching circuit by bridging pins 1 and 3 on the DIN cassette connector with a short length of wire, and confirm that the contacts on the large relay open and close. Connect a 120V lamp to the relay and repeat this test to demonstrate that making contact between these two pins will turn the lamp on.

With these tests complete, begin exercising control directly from the computer keyboard. Connect the DIN plug to the socket labeled *CASSETTE* on the computer, place the cursor over *BASIC* and press *ENTER*. When you get the *OK* prompt, type *MOTOR ON* and press *ENTER* to switch the contacts on. Type *MOTOR OFF* and press *ENTER* to switch them off. (As tiny as the cassette relay is, it draws a large chunk of battery power compared to normal use, so plug in your AC adapter, or the *MOTOR ON* commands will quickly deplete the internal AA batteries.)

Assuming that the attached lamp is turning on and off, the hard part is over and the fun part begins. Type *NEW*, press *ENTER*, and then type in the program in Listing 1.

REAL LAMP CONTROL

Press *F4* (or type *RUN* and press *ENTER*), and you have the

```
10 LINE INPUT "Turn Lamp... (ON or OFF)"
; A$
20  IF A$ = "ON" OR A$ = "on" THEN MOTOR
 ON
30  IF A$ = "OFF" OR A$ = "off" THEN MOT
OR OFF
50 GOTO 10
```

Listing 1. A sample program that tests your controller by turning on a lamp at your command.

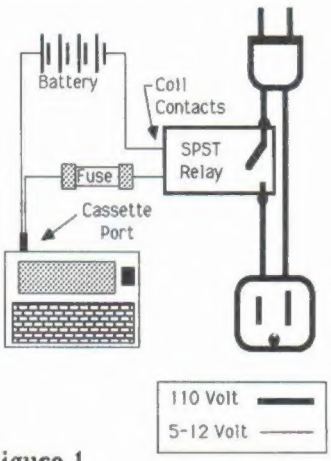

Figure 1. Controller Wiring

Figure 1. Wiring diagram to set up a real-world controller using a relay hooked to a 120-volt device such as a lamp.

beginnings of understanding *real-world control*. When you tire of switching the lamp on and off, hold the *SHIFT* key and press *BREAK* to end the program. Now let's get a bit more sophisticated and add the second element, the clock.

Access to the clock-calendar opens many possibilities for computer control. Time and date information is available to *BASIC* in the *TIME$* and *DATE$* strings. (You saw these when you first set the correct time and date in the computer.) This lets you control events at predetermined times of day, for days, weeks, months, or even years in the future. (At the moment, controlling events in the past is beyond even the Model 100's capabilities.)

TIME$* and *DATE$ are "strings," the same type of data retrieved by the *LINE INPUT* statement in Listing 1 as it gets the *ON* and *OFF* information from you at the keyboard. To begin understanding these concepts, type *NEW*, press *ENTER* (or *SAVE* the listing to a file and type *NEW*), and then type in the program in Listing 2.

REAL TIMED CONTROL

I've tried to keep the programming simple for those who have never written a program before. If you're a beginner, you need to know and observe a few rules. Punctuation is important. Misplacing commas, semicolons, or quotation marks can cause total failure and frustration. You don't have to include space characters when programming on the Model 100, but I strongly suggest that you use them to make your programs easier to read and debug. Also, if and when you begin programming on other computers, or move some of your programs to them, the spaces will become essential.

Computers and programs are literal. The *on* and *off* times that you type in must exactly match the *TIME$* format. You must type all digits and colons in the right spots, or the computer concludes in lines 50 and 80 that the strings don't match when the correct time rolls around. Finally, don't confuse *O*'s (letters) with *0*'s (zeros).

When you run this program, the screen should clear and display the time the program was started. Answer the time questions with times that are about a minute later than the time displayed at the top of the screen; then wait for the computer to switch the lights at the selected time. (If you take the Model 100 with you on trips, you now have a traveling companion that can switch on *Good Morning America* in your motel room at a selected time. But don't blame me if unplugging the TV trips a theft alarm.)

If you program alarms and events to occur in the absence of humans, don't *END* or *STOP* your program with a *MOTOR ON* command. The contacts will close, but the Model 100's automatic power-off feature will turn the computer off a few minutes later, and the contacts will open again. Instead, rather than disable the computer's power-off function, you can prevent the computer from powering off. Keep the computer busy by writing an endless loop or by ending the program with an *INPUT* statement.

UNLEASH YOUR IMAGINATION

The programming ball is now in your court. Rather than keying in someone else's program, build one to fit your needs. Then revise it. Improve it. Expand it. The principles discussed here give the Model 100 vast potential to control applications, a potential limited only by the imagination.

As an example of what you can do, I use these techniques to control the entire high-temperature firing operation of two 240-volt, 50-ampere pottery kilns. The computer waits until the early morning hours, then begins powering up the kilns at a selected time. Switching the contacts on and off (pulsing them) creates a smooth increase in power, which increases the heat level gradually from zero to 100 percent over a six-hour start-up period.

The Model 100 then holds full power for six hours until the oven reaches 2200 degrees Fahrenheit; then the computer lowers the kiln power to 75 percent to maintain that high temperature for twenty minutes. Finally, the process is ended by a slow, four-hour power reduction period to avoid thermal shock to the finished sculpture. Again, this process is accomplished by switching the cassette motor contacts on and off with a *BASIC* program. (See the Fall '86 *Studio Potter Magazine* for more details.)

The only problem is that this project has been so successful and such a great time saver that the two kilns fire almost daily, which completely monopolizes a Model 100. But it's worth it. The labor and time necessary to monitor each firing has been cut 90 percent, and it's eliminated the need to be with the kiln from the beginning to the end of a 14- to 16-hour firing process. To track kiln performance, I've also revised the program to keep a record of every firing, print a daily report, and graph time versus temperature on an Epson printer.

So look around. Do you see any applications to this *real-world control* that would work around *your* house or business? Who knows, perhaps you can keep away burglers, or feed your dog, or have your breakfast ready for you with only a little effort.

```
10   CLS
20   PRINT TIME$ + " <--- Times must be
entered in exactly"
30   PRINT "                    this format
!"
40   LINE INPUT "Enter time to switch La
mp ON " ; A$
50   LINE INPUT "Enter time to switch La
mp OFF " ; B$
60   CLS
99   REMark Waiting for ON time loop
100  IF TIME$ = A$ THEN MOTOR ON: GOTO 1
50
110   PRINT@1, TIME$ + " Will Switch ON
at-->" + A$
120  GOTO 100
149  REMark Waiting for OFF time loop
150  IF TIME$ = B$ THEN MOTOR OFF: END
160   PRINT@1, TIME$ + " Will Switch OFF
 at-->" + B$
170  GOTO 150
```

Listing 2. A program that switches on a device any time or date you specify.

Compatibility: Tandy 100/1-2/200, Olivetti M10, Kyocera KC-85 UNTESTED: Tandy 600, 1400LT

Scarney 3000 Meets the Model 100

Not exactly a crapshoot, but it's dicey.

by Ralph Sherman

Some of the best games are those with simple strategy but action so fast and fascinating that play becomes addictive.

One such game is Scarney 3000, a game invented by John Scarne (pronounced "Scarney"), the gambling expert. You play with five special dice called Scarney dice.

Similarly addictive is *SCARNE.BA*, an adaptation of Scarney 3000 in which you play against the Model 100. *SCARNE.BA*, which requires 4,827 bytes of memory, moves quickly and combines luck with just enough skill to give a good player an edge in the long run.

RULES OF THE GAME

Scarney 3000 is played with Scarney dice, whose six faces show the numerals 1, 3, 4 and 6, and the word "Dead" on two faces. Scarney dice are used in Scarney 3000 and dozens of other games that John Scarne invented during his lifetime and described in his books.

Virtually any number of people can play Scarney 3000, and all the players play an equal number of turns, until one or more players reaches a score of at least 3,000. If all the players have had an equal number of turns, and scores are tied at or above 3,000, play continues until one high score remains and therefore leaves one winner.

To begin, one player rolls the five dice. For the player's turn to continue, the roll must contain one or more *dead* dice or a bonus—three, four, or five of a kind, including *dead*. If the roll does not meet this requirement, then the roll is "bad," the player's turn is over, and he passes the dice to the next player. This basic rule applies to every roll in the game; if player fails to roll any dead dice and fails to roll a bonus, the player's turn is over, and he receives no score for any of his rolls during that turn.

If the player's roll is good, the player may choose to roll again, or may be required to roll again, according to these rules:

1. A player must continue to roll until his score for the turn is at least 200.

2. A player must continue to roll until he has rolled at least one dead die sometime during his turn. The dead die may be rolled on the first roll or on a subsequent roll in the same turn, and the dead die may be part of a bonus roll.

When a player rolls a bonus of ones, threes, fours or sixes but has not yet rolled any dead dice in the same turn, the bonus is said to be unconfirmed; rolling the necessary dead die afterward is called confirming the bonus.

When a player makes a good roll and rolls again in the same turn, he puts aside the bonus and/or dead dice and rolls whatever dice remain. If no dice remain, the player rolls all five dice.

```
Ø ' SCARNE.BA
1 ' SCARNEY 3ØØØ by John Scarne
2 ' adapted for the Model 1ØØ by Ralph S
herman
3 ' created 11/3Ø/87 - revised Ø5/25/88
1Ø CALL16959:ES$=CHR$(27):WB$=ES$+"p":BW
$=ES$+"q":D$="DD1346"
13 '
14 ' D1$ = unsorted array : D2$ = sorted
 array : F = tabulation array
15 DIMD1$(6),D2$(6),F(6)
16 POKE64634,PEEK(63791)
2Ø CLS:PRINT@135,"Sound (y/n)?"
25 SO$=INKEY$:IFSO$<>"y"ANDSO$<>"n"THEND
U=RND(1):GOTO25
3Ø CLS:FORX=ØTO4:LINE(83-X,15+X)-(155+X,
15+X):NEXTX
33 FORX=1TO4:LINE(79+X,19+X)-(159-X,19+X
):NEXTX
34 LINE(75,19)-(163,19)
37 PRINT@94,WB$;"SCARNEY 3ØØØ";BW$:GOSUB
8ØØØ:GOSUB8Ø2Ø
4Ø PRINT@172,"a game with dice":PRINT@21
3,"by John Scarne":GOSUB8ØØØ:GOSUB8Ø2Ø:G
OSUB8Ø2Ø
45 PRINT@17Ø,"modified and adapted":PRIN
T@212,"to the Model 1ØØ":PRINT@252,"by R
alph Sherman":GOSUB8ØØØ
5Ø GOSUB8Ø2Ø:GOSUB8Ø2Ø
53 '
54 ' Who plays first?
55 CLS:PRINT@124,"Do you want to roll fi
rst (y/n)?":GOSUB8Ø5Ø
6Ø A$=INKEY$:IFA$<>"y"ANDA$<>"n"THENDU=R
ND(1):GOTO6Ø
63 '
64 ' if you roll first, T = 1 : if M1ØØ
rolls first, T = 2
65 T=INSTR("yn",A$)
68 '
69 ' draw the tableau
7Ø CLS:PRINT@7Ø,"this turn":LINE(177,5)-
(235,25),1,B:LINE(178,4)-(236,4):LINE(23
6,5)-(236,24)
```

continued

Listing 1. The game SCARNE.BA, *a simple game of chance that requires enough skill to give a good player an edge.*

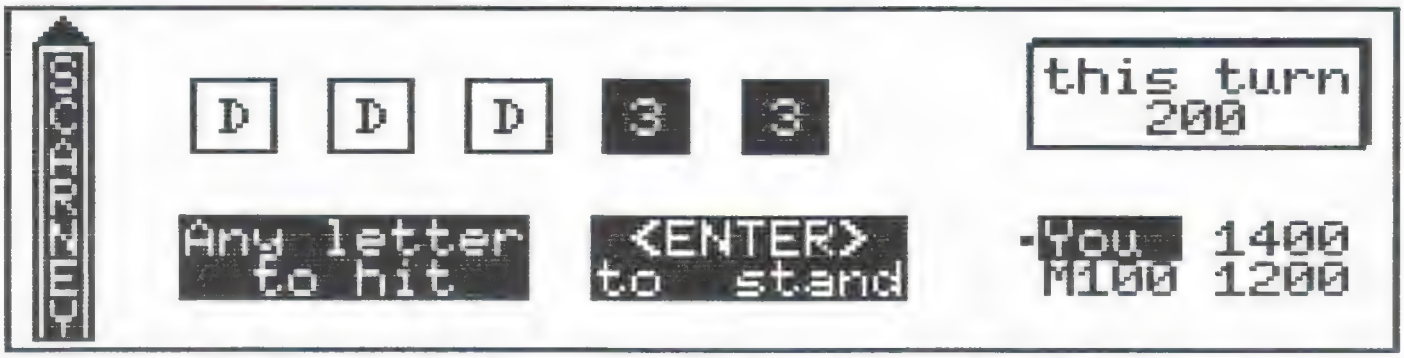

Figure 1. The playing tableau, which controls the flow of the game, and displays the dice (upper left), the scores (lower right), and the player's options.

Scoring is the only area in which Scarney 3000 and *SCARNE.BA* differ; the scoring system has been modified for *SCARNE.BA* to make the game more interesting. In *SCARNE.BA*, a bonus roll of three of any number is worth 100 times the number; four of a kind is worth 200 times the number; five of a kind is worth 400 times the number. One or two dead dice count for 50 points each, and dead dice bonuses count for 200, 400, or 800 (for 3 through 5 dead dice, respectively).

All this may seem complicated at first, but it really isn't.

Let's say that in a two-player game, Player A rolls *1-1-3-4-6*. He has neither dead dice nor a bonus, so he scores zero for the turn and passes the dice to Player B.

Player B then rolls *D-3-3-3-6*. The roll is worth 50 for the dead die and 300 for the bonus of threes; because B has rolled at least one dead die during his turn, the score of 350 is confirmed.

Because B's score for the turn is confirmed and is at least 200, B has the option of keeping the score and passing the dice, or putting the four scoring dice aside and rolling the fifth die. But if B chooses to roll the fifth die, he must roll a dead die to hold on to his 350 points. Why? Because of the basic rule: If, on any roll, a player rolls no dead dice and no bonus, his turn is over, and he receives no score for any of the rolls during that turn.

Let's say that B rolls the fifth die and it comes up dead. That adds 50 points to B's 350 for the turn and gives B the option of quitting with 400 points or continuing by rolling all five dice. Obviously, if B rolls five dice, his chance of rolling any dead dice or a bonus is very good; players usually continue when they have a chance to roll all five dice again.

Suppose B does roll the five dice, and they come up *1-1-1-3-3*. B adds a bonus of 100 points (for the three *1*'s) to his 400, for a total of 500 points for the turn. Again he may quit or roll the remaining dice, the two *3*'s. Let's say he decides to quit and keep the 500 points.

Next A rolls *1-3-5-5-5*, for a bonus of 500 points. He's past the 200-point minimum score per turn, but he still must roll at least one dead die to confirm his bonus. He rolls the two dice that showed *1-3*, and they come up *D-3*. The one dead die confirms his bonus and adds 50 to his score for the turn, and he then may choose to roll the remaining die or to stand with 550 for the turn.

The game continues in this manner until there is only one high score above 3,000 and the players have had the same number of turns. If, for example, a player reaches 3,000 on his fifth turn, the game continues until all players have had five turns; then the highest score over 3,000 wins. In case of a tie score over 3,000, play continues until there is only one high score and the players have had equal turns.

PLAYING AGAINST THE MODEL 100

SCARNE.BA is strictly a two-player game in which you play against the Model 100. When you run the program, it begins by asking you whether you want sound to accompany the play of

```
73 FORZ=0TO4:LINE(8-Z,Z)-(8+Z,Z):NEXTZ
75 LINE(5,7)-(11,63),1,B:LINE(3,5)-(13,6
3),1,B
77 FORZ=1TO7:PRINT@(Z-1)*40+41,WB$;MID$(
"SCARNEY",Z,1):NEXTZ:PRINTBW$
80 IFT=1THENX=43ELSEX=51
85 LINE(176,X)-(177,X+1),1,B
90 IFT=2THEN1000
98 '
99 ' your turn
100 IFT=1AND(SY>2999ORSM>2999)ANDSY<>SMT
HEN5000
105 GOSUB500:LINE(179,48)-(203,56),0,B:P
RINT@230,WB$;"You ";BW$:PRINT@270,"M100"
110 LINE(179,39)-(203,47),1,B:IFSO$="y"T
HENSOUND6000,4:GOSUB8010
118 '
119 ' D = # of dice to roll : ST = "your
 turn" score : FD = dead-dice flag
120 D=5:ST=0:FD=0:IFINKEY$<>""THENDU=RND
(1):GOTO120
130 GOTO160
140 GOSUB2000
150 IFST=0THEN1000
160 IFDT=0THENDT=5
170 GOSUB8070
180 IFFD=1ANDST>199THENLINE(101,39)-(155
,55),1,B:PRINT@217,WB$;" <ENTER> ":PRINT
@257,"to  stand";BW$:GOSUB8050
190 IFINKEY$<>""THENDU=RND(1):GOTO190
200 A$=INKEY$:IFA$=CHR$(13)ANDFD=1ANDST>
199THENSY=SY+ST:PRINT@235,USING"####";SY
:GOSUB2116:GOTO1000
210 IFA$=ES$THENMENU
220 IFA$=""THEN222
221 IFASC(A$)>96ANDASC(A$)<124THEN230
222 DU=RND(1):GOTO200
230 D=DT:GOSUB500:GOTO140
498 '
499 ' clear the playing area
500 FOR Z=43TO243STEP40:PRINT@Z,SPACE$(2
5):IFINKEY$=ES$THENMENU
510 NEXTZ:RETURN
998 '
999 ' Model 100's turn
1000 IFT=2AND(SY>2999ORSM>2999)ANDSY<>SM
THEN5000
1005 GOSUB500:LINE(179,39)-(203,47),0,B:
PRINT@230,"You "
```

continued

the game. You press *y* or *n* to answer; opting for soundless play lets you pass the time unobtrusively during boring staff meetings.

After displaying the title of the game, the program asks you if you want to take the first turn. Going second gives you a slight advantage at the end of the game, because you know for certain when you can quit with a winning score; but if you play more than one consecutive game with the Model 100, the program automatically reverses the order of players with each new game.

After you determine who plays first, the program creates a playing tableau as shown in Figure 1. The *BASIC* command

Scarney for Other Computers!

Editor's Note: As described in the article text, the *CALL 16959* in line 10 disables automatic screen scrolling to preserve the graphic display. To do this on other computer models, you would need to know the proper call address for each machine.

A more generic way is to use escape codes. Printing *ESC-T* disables scrolling on all notebook computers. Line 10 already defines the escape character—*CHR$(27)*—as *E$*. So you can make line 10 work on all notebook machines by changing it as follows:

```
10 ES$=CHR$(27): WB$=ES$+"p": BW$=ES$+"q":
D$="DD1346": PRINTE$"T"
```

Line 16 presents a similar situation. It reseeds the random number generator with a value obtained by *PEEK*ing the address of the cursor-flash counter. Since the count changes constantly, its value is unpredictable at any given moment, making it a good seed for the random number generator. But again, for other computer models, you'd need to know the addresses of the random seed and the counter.

A more generic solution uses a two-part approach. First, for a constantly changing value, how about the clock? On all notebook computers, *VAL(RIGHT$(TIME$,2))* gives a value equal to the clock seconds (0-60) at any given moment. Secondly, when the *n* in *RND(n)* is a negative number, the computer automatically reseeds the random number generator (an undocumented feature), so you needn't know the address of the random seed. Thus, by substituting clock seconds for value *n* (and making it negative) the following line will work on any notebook machine:

```
16 X=RND(-VAL(RIGHT$(TIME$,2)))
```

Note that variable *X* is there just to make it a legal executable statement.

By changing lines 10 and 16 as shown, *SCARNE.BA* will work on all notebook computers except the NEC's. (They require further modification to get around the lack of a *LINE* command.)

If you write programs for only your own use, anything that works is fine. But if you'll be sharing your masterpiece with others, it's worth giving some thought to making it generic. Avoid *PEEK*, *POKE*, and *CALL* as much as possible. Users of other machines will love you for it. And so will technical editors! *-MN*

```
1Ø1Ø PRINT@27Ø,WB$;"M1ØØ";BW$:LINE(179,4
7)-(2Ø3,55),1,B:IFSO$="y"THENSOUND6ØØØ,4
1Ø2Ø D=5:ST=Ø:FD=Ø
1Ø3Ø GOSUB2ØØØ
1Ø4Ø IFST=ØTHEN1ØØ
1Ø44 '
1Ø45 ' Model 1ØØ strategy
1Ø5Ø IFDT=ØTHENDT=5
1Ø55 IFSM+ST>2999ANDSM+ST>SYANDST>199AND
FD=1AND((T=1)OR(SM+ST>SY+399))THEN16ØØ
1Ø6Ø IFST<2ØØORFD=ØORDT=5OR(SY>2999ANDSY
>SM+ST)THEN15ØØ
1Ø7Ø FORZ=ØTOVAL(RIGHT$(TIME$,1)):DU=RND
(1):NEXTZ
1Ø8Ø IFSM+ST-SY>699THEN16ØØ
1Ø85 IFSM+ST>2999ANDSM+ST-SY>399THEN16ØØ
1Ø9Ø ONDTGOTO11ØØ,12ØØ,13ØØ,14ØØ
1Ø98 '
1Ø99 ' one die to roll
11ØØ IFST<35ØANDSY<26ØØANDSY-SM<4ØØANDRN
D(1)<.3333THEN15ØØ
113Ø GOTO16ØØ
1198 '
1199 ' two dice to roll
12ØØ IFST<35ØANDRND(1)<.5556THEN15ØØ
124Ø GOTO16ØØ
1298 '
1299 ' three dice to roll
13ØØ IFST<7ØØANDRND(1)<.7Ø37THEN15ØØ
134Ø GOTO16ØØ
1398 '
1399 ' four dice to roll
14ØØ IFST<7ØØANDRND(1)<.8Ø25THEN15ØØ
142Ø GOTO16ØØ
1498 '
1499 ' Model 1ØØ hits
15ØØ D=DT:GOSUB8Ø2Ø:GOSUB5ØØ:GOTO1Ø3Ø
1598 '
1599 ' Model 1ØØ stands
16ØØ SM=SM+ST:GOSUB8Ø2Ø:RØ=RØ+1:PRINT@27
5,USING"####";SM:GOSUB2116:GOTO1ØØ
1998 '
1999 ' roll the dice
2ØØØ FORD1=1TOD:FORZ=1TOVAL(RIGHT$(TIME$
,2))/5:DU=RND(1):NEXTZ
2Ø1Ø D1$(D1)=MID$(D$,RND(1)*6+1,1):NEXTD
1
2Ø2Ø A=1:FORD1=2TO6:FORD2=1TOD:IFD1$(D2)
=MID$(D$,D1,1)THEND2$(A)=D1$(D2):A=A+1
2Ø3Ø NEXTD2:NEXTD1
2Ø4Ø FORD1=1TOD:LINE(24*D1+7,12)-(24*D1+
21,26),1,BF:PRINT@82+4*D1,WB$;D2$(D1):GO
SUB8ØØØ
2Ø5Ø NEXTD1:PRINTBW$
2Ø58 '
2Ø59 ' analyze the roll
2Ø6Ø DT=D:FORZ=2TO6:F(Z)=Ø:NEXTZ
2Ø7Ø FORD1=2TO6:FORD2=1TOD:IFD2$(D2)=MID
$(D$,D1,1)THENF(D1)=F(D1)+1
2Ø8Ø NEXTD2:NEXTD1
2Ø88 '
2Ø89 ' B = type of bonus (1,3,4,6)
2Ø9Ø B=Ø:IFF(2)>ØTHENFD=1
2Ø95 FORZ=3TO6:IFF(Z)>2THENB=Z:Z=6
21ØØ NEXTZ:IFB>ØORF(2)>ØTHEN212Ø
```

continued

CALL 16959 in line 10, keeps the display from scrolling, which would ruin the tableau. (If you interrupt the program by pressing *SHIFT-BREAK*, you can re-enable the display scroll by typing *CALL 16964*, or by going to the main menu and returning to *BASIC*.)

At the upper right of the tableau is a box where the temporary score for the current turn is displayed. The *this turn* score is represented by the variable *ST* in the program.

At the lower right are areas where your score (the variable *SY*) and the Model 100's score (the variable *SM*) are displayed. A small dot appears to the left of *You* or *M100* to indicate which player took the first turn in the current game; the name of the current player is shown in reverse video. (The string variables *WB$* and *BW$*, defined in line 10, are used in various places in the program to switch to and from reverse video.)

If you have opted for sound effects, the dice make high-pitched clicks as they are rolled.

Figure 1 shows a tableau in the middle of a turn, so dice are displayed at the upper left. Although each roll is random, the dice always are displayed on the screen in ascending numerical order, with dead dice ranking lowest.

When the dice first appear with each roll, they are black with white characters on their faces. In a moment, however, dead and bonus dice change to white with black characters as their points are added to the *this turn* score.

Below the dice in Figure 1 are the instruction boxes, which appear as needed during your turn. The instruction boxes tell you almost everything you need to know to operate the computer during the game.

There are three basic elements in any dice-game program ...

If it's your turn to roll, the first box appears, saying *Any letter to hit*. In other words, to roll the dice, press any letter key.

If you have the option of keeping your *this turn* score and passing the dice to the Model 100, the second instruction box also appears, saying *<ENTER> to stand*—that is, to keep your *this turn* score and quit your turn, press the *ENTER* key. This instruction box appears only if you have rolled at least one dead die and have a *this turn* score of at least 200.

If any roll is bad, in your turn or the Model 100's turn, the message *NO SCORE THIS TURN* appears below the dice in the display. If you have opted for sound effects, you will hear a low-pitched buzz. Then the *this turn* box clears, and the other player's turn begins.

To quit the game at any time, even during the Model 100's turn, press *ESC*. The computer responds by returning to the main menu.

At the end of the game, a short melody plays if you have asked for sound to accompany the game. The display shows who won the current game and how many games you and the Model 100 each have won during the current session of play. The computer also asks if you want to play again; if you answer *n*, the computer goes to the main menu.

HOW *SCARNE.BA* WORKS

There are three basic elements in any dice-game program or card-game program in which you play against the computer.

First, the program must generate a random roll of dice (or deal of cards) and display the results on the screen.

Second, the program must analyze the results so that the computer can decide how to play in its turn and ensure that you follow the rules in your turn. In *SCARNE.BA*, the same analysis subroutine is used in your turn and in the Model 100's turn.

Third, the program must have a subroutine that gives the computer its strategy for play during its turn.

In *SCARNE.BA*, the first element—rolling and displaying the dice—is contained in lines 2000 through 2050. As the dice are rolled, in lines 2000 and 2010, the character shown on each die is stored in array *D1$*. Then, in line 2020, the characters in *D1$* are sorted and stored in array *D2$* to make each roll easier for you and the computer to analyze. The dice display is created by line 2040.

The second basic element—the analysis of the roll—is contained in lines 2060 through 2200. Each section of the analysis is labeled in the program, but two points are worth mentioning here: the array *F* is used for tabulating possible bonuses, and the dead and bonus scores are calculated in lines 2120 and 2180.

The third basic element—the Model 100's strategy—is located in lines 1050 through 1600. The parameters for decision-making are based mainly on probability and partly on trial and error in tests of the program.

Throughout the program, randomization is achieved by using the expression *DU=RND(1)* to skip through the random-number series generated by the *RND* function.

```
2108 '
2109 ' announce a bust roll
2110 GOSUB8010:PRINT@165,"NO SCORE THIS
TURN.":IFSO$="y"THENSOUND16000,30
2115 GOSUB8020
2116 PRINT@112,"     ":GOSUB5000:D=5:DT=5:
ST=0:RETURN
2118 '
2119 ' examine a good roll for dead dice
2120 IFF(2)>2THENST=ST+100*2^(F(2)-2):DT
=D-F(2)
2130 IFF(2)<3THENST=ST+50*F(2):DT=D-F(2)
2140 FORZ=1TOD:IFD2$(Z)="D"THENLINE(24*Z
+7,12)-(24*Z+21,26),0,BF:LINE(24*Z+7,12)
-(24*Z+21,26),1,B:PRINT@82+4*Z,D2$(Z)
2150 NEXTZ
2168 '
2169 ' examine a good roll for bonus dic
e
2170 IFB=0THENGOSUB8030:RETURN
2180 ST=ST+VAL(MID$(D$,B,1))*100*2^(F(B)
-3):DT=DT-F(B)
2190 FORZ=1TOD:IFD2$(Z)=MID$(D$,B,1)THEN
LINE(24*Z+7,12)-(24*Z+21,26),0,BF:LINE(2
4*Z+7,12)-(24*Z+21,26),1,B:PRINT@82+4*Z,
D2$(Z)
2200 NEXTZ
2210 GOSUB8030
2220 RETURN
4998 '
4999 ' end of game
5000 GOSUB500:IFSY<SMTHEN5020
5010 PRINT@7,"* * You won! * *":K=K+1:GO
TO5030
5020 PRINT@4,"* * Model 100 won! * *":J=
```

continued

A FIELD-TESTED STRATEGY

After an early version of *SCARNE.BA* had been played about 100 times, I believed that the Model 100's strategy could be improved. The addition of about 20 lines to the program yielded something called *SCARN2.BA*—not shown in this article—that kept statistics on the game by creating and updating a text file of scores and other figures. After I studied the statistics from 10 games, the Model 100's strategy was changed, and 10 games were played with the improved strategy and with *SCARN2.BA* keeping the long-term score. The results with the improved strategy were as follows, according to *SCARN2.BA*:

Of the 10 games, the Model 100 won six. The average score per turn (based on the sum of both players' scores) was 349; on 49 percent of the turns, the players increased their scores. The average number of turns per game was 15.

Thus, with the average score per turn being about 350, and only half the turns resulting in new points, it made sense to use the numbers 350 and 700 in the Model 100's strategy (lines 1050 through 1600).

The fractional numbers in the strategy part of the program are based on the probability of rolling at least one dead die in each instance—with one, two, three or four dice to roll. When the Model 100 has five dice to roll, it always rolls, unless it already has enough points to win the game.

This strategy makes the Model 100 a relatively conservative player because its decision-making doesn't consider the possibility of rolling bonus dice. A human player who plays more adventurously than the Model 100 might therefore have an advantage.

LOADING THE PROGRAM

Of the several ways to get *SCARNE.BA* into your Model 100, one way is to type the program from Listing 1. Another way is to get it on the *P100-To-Go* disk, and the third way is to download it from the *Portable BBS*.

If you type the program into your computer from this article, you will find that an easy method is to create a text file called *SCARNE.DO* and type the program there. This method allows you to use the editing features of *TEXT* if you make an error, but you need at least 11,000 free bytes of memory when you start. When you have completed your text file, go to *BASIC*, type *LOAD "SCARNE"* and press *ENTER*. The *Wait* message flashes as *BASIC* creates a program from the text file. When the *Ok* prompt appears, type *SAVE "SCARNE.BA"* and press *ENTER* to save the program under the name *SCARNE.BA*. Then type *KILL "SCARNE.DO"* and press *ENTER* to kill the text file.

Then try to quit playing. Good luck!

Ralph Sherman is a gamester and computer hobbyist who lives in Waterbury, CT. When he's not writing game programs or music, he's using his Model 100 in his studies at the University of Connecticut School of Law.

```
J+1
5Ø3Ø PRINT@88,"--GAME TALLY--":PRINT@128
,"You          ";K:PRINT@168,"Model 1ØØ
 ";J
5Ø4Ø IFSO$="y"THENSOUND395Ø,2Ø:SOUND395Ø
,2Ø:SOUND4433,1Ø:SOUND4697,1Ø:SOUND4697,
2Ø:SOUND4976,1Ø:SOUND4697,1Ø:SOUND4697,4
Ø
5Ø5Ø GOSUB8Ø2Ø:PRINT@287,"Play again (y/
n)?":GOSUB8Ø5Ø
5Ø6Ø A$=INKEY$:IFA$<>"y"ANDA$<>"n"THENDU
=RND(1):GOTO5Ø6Ø
5Ø7Ø IFA$="n"THENMENUELSESY=Ø:SM=Ø:T=3-T
5Ø8Ø GOTO7Ø
7998 '
7999 ' dice sound effect
8ØØØ IFSO$="y"THENSOUNDØ,1:SOUND1ØØØ,1
8Ø1Ø FORZT=1TO3Ø:NEXTZT:RETURN
8Ø18 '
8Ø19 ' pause
8Ø2Ø FORZT=1TO3ØØ:NEXTZT:RETURN
8Ø28 '
8Ø29 ' display "this turn" score
8Ø3Ø IFST>ØTHENPRINT@112,USING"####";ST
8Ø4Ø RETURN
8Ø48 '
8Ø49 ' click sound effect
8Ø5Ø IFSO$="y"THENSOUNDØ,1:SOUND1ØØØØ,1
8Ø6Ø RETURN
8Ø68 '
8Ø69 ' "hit" prompt
8Ø7Ø LINE(29,39)-(89,55),1,B:PRINT@2Ø5,W
B$;"Any letter":PRINT@245,"  to hit  ";B
W$
8Ø8Ø GOSUB8Ø5Ø:RETURN
```

End of listing.

COMPATIBILITY: Tandy 100/102/200, Olivetti M10, Kyrocera KC-85, NEC PC 8201A/8300 UNTESTED: Tandy 600, 1400LT

And They're Off ...

Picking the right horse is more than just luck with this program.

by Terry Kepner

Gambling with money has never interested me: I know the odds are not in my favor. Horse race handicapping in particular has always appeared to me a matter of luck, or perhaps prescience. After all, with all the impossible-to-predict variables in horse racing (half a dozen individual and sometimes skittish horses, jockeys, and trainers, the track itself, and the weather, to name but a few), it doesn't seem that a system could be devised to take them all into account. But the *Enhanced Racing Analysis Package* from Software Exchange has changed my mind. It *is* possible to pick a winning horse from a field of half a dozen or more horses, and to do it consistently from information readily available to every bettor at the track.

The *Enhanced Racing Analysis Package* is a *BASIC* program designed to run on the Tandy 100, 102, and 200 computers. (It appears to run just as well on the Olivetti M10, KC-85, and NEC-8201/8300. Test races all gave the same results.) It isn't a large program, just a little over 4.5K in size. And it's easy to use, which is fortunate, because the instructions that came with it consisted of one 8.5- x 11-inch page that essentially says just "run it and follow the prompts."

I decided that the best way to test the program was to buy a copy of the *Daily Racing Form*, a nationwide newspaper that covers the racing industry by regions (that is, the local *Daily Racing Form* covers only local race tracks). Each paper has the day's racing prospects listed, as well as the results of the races from two days before (the July 17th paper has that day's races and the results from July 15th).

As well as listing the horses for each race, the *Daily Racing Form* also lists each horse's past racing performances, if available, for the last two years. Thus I figured I could get away with buying two papers and not having to go to the track itself. Unfortunately, it didn't quite work out that way.

AT THE GATE

Being a novice to the field, I became totally confused in short order. However, I picked up a simple $4.95 booklet entitled *Track Talk*, which gave me the background information I needed (you can find similar booklets at race tracks or in book stores). Armed with this fresh knowledge, I tried again.

The program starts with a simple menu (see Figure 1). I selected *1-Thoroughbred Racing Analysis 2*. This led to a prompt requesting the race number I wanted to analyze. After typing a *1*, I was given an impressive list of 16 possible track distances (see Figure 2). Next the program requested the number of entries in the race, with a maximum of 26. (The race I was testing was six furlongs, with nine horses.) Then we got down to the nitty gritty.

For each horse in the running, the program wanted to know the length of the last race the horse ran, its post position (position in relation to the inside rail of track), the morning line odds (odds for winning, such as 3-to-1), its last speed rating, its best of the last three speed ratings, its last three positions in the stretch (coming around the corner of the track on the straightaway to the finish line), and its position in its last three finishes.

All this information was available right out of the *Daily Racing Form* (I still don't know what speed rating is, but I found it labeled on the form) with one exception: the morning line odds. Instead of morning line odds, set by race track management when the horses are brought up on the track, the *Daily Racing Form* uses its own handicap estimates. Just how the program uses this information and whether the program makes important decisions based on it, I don't know. Information that wasn't

```
ENTER SELECTION NUMBER

1-THOROUGHBRED RACING ANALYSIS 2
2-HARNESS RACING ANALYSIS 2
3-BET RETURN ANALYSIS
4-END PROGRAM
?


THOROUGHBRED RACING ANALYSIS 2

ENTER RACE # ?
```

Figure 1. The main menu of the Enhanced Racing Analysis Package. *From here you analyze and predict either thoroughbred racing or harness racing using information you can get at any newsstand.*

```
TRACK LENGTH-DISTANCE
1)  4 F          7)  7 F          13) 1 5/16  MILES
2)  4 1/2 F      8)  7 1/2 F      14) 1 3/8   MILES
3)  5 F          9)  1 MILE       15) 1 7/16  MILES
4)  5 1/2 F      10) 1 M 70Y      16) 1 5/8   MILES
5)  6 F          11) 1 1/16  MILES
6)  6 1/2 F      12) 1 1/8   MILES
ENTER # (1-16)? 5
```

Figure 2. After pressing 1 on the main menu, you get 16 possible racing distances to choose from.

available (for example, this was the second race ever run by this horse, meaning the best of three was only best of two, and that there were only two last stretch and finishes) was input as a zero.

After I entered all nine horses, the *Enhanced Racing Analysis* program gave each horse a rating and displayed them on the LCD, then sorted them high to low. This is the order in which the program predicts the horses will finish. After displaying the sorted list, you have the option to print it to paper, review the list, or do another race.

Saying *no* to the *Another Run* prompt takes you back to the main menu. Saying *yes* takes you to the track length list (Figure 2) again.

The second menu choice, *2-Harness Racing Analysis 2*, was similar to choice 1, except the track distances were different (see Figure 4). There not being any harness races in the area meant I couldn't test that part of this program. I presume it works as well as the *Thoroughbred Racing Analysis* section.

IN THE STRETCH

Here were several things I didn't like about the program. First, you have no way to correct a typing mistake once you've pressed *ENTER*. If you're on entry 12 and press the wrong key, your only choice is to press *SHIFT-BREAK* and start all over (the new version fixes this). Similarly, you can't save the details you've typed. So when you get to the track, if you discover that one of the horses has been scratched (removed) and another substituted, you have to re-run that race analysis from the beginning. Finally, the program makes no allowances for track conditions. Some horses don't mind muddy tracks; others positively hate it. This does have an impact on the race finish.

The first two, however, are minor annoyances. It takes only about ten minutes to key in a race, so retyping a race is not a catastrophe. Also, you usually have about fifteen to twenty minutes between the end of one race and the beginning of the next, plenty of time to rekey a race if you must.

As for track conditions, if you live in California or the sunbelt, track conditions almost always are excellent, so that shouldn't necessarily be a problem.

Manufacturer's Specifications

Software Exchange
2681 Peterboro Road
P.O. Box 5382
West Bloomfield, MI 48033
(313)626-7208
(800)527-9467 (orders only)

The reviewed package was an early version. Newer versions of *Enhanced Racing Analysis Package* have been improved, for example, to allow data re-entry after typing errors. The newest is *Advanced Thoroughbred Racing System*.

Enhanced Racing Analysis Package—$49.95
Advanced Thoroughbred Racing System—$64.95
Advanced Harness Racing System—$64.95
Enhanced Quarter Horse System—$64.95
Advanced Greyhound Racing System—$74.95.

Computers supported:

Apple II+, IIc, IIe, IIgs, Macintosh
Atari 130XE, 400, 600, 800, 1200, XL, 520, 1040ST
Commodore 64, 128
IBM PC, PCjr, XT
Tandy 1000 and compatibles
TRS-80 Model 100/102/200

```
RACE # 1

ENTRY    9      RATING    11.28
ENTRY    7      RATING    9.77
ENTRY    1      RATING    7.92
ENTRY    2      RATING    7.58
ENTRY    8      RATING    7
ENTRY    4      RATING    6.58
ENTRY    5      RATING    6.25
ENTRY    6      RATING    5.83
ENTRY    3      RATING    4.98
```

Figure 3. The entries in one race listed in order of predicted finish. Here, the horse in the ninth post position is most likely to win, according to the program.

```
ENTRY # 1  RACE # 1

TRACK LENGTH-LAST RACE
1) 1/2 MILE  3) 3/4 MILE
2) 5/8 MILE  4) 1 MILE

ENTER # (1-4)?

ENTER TODAY'S POST POSITION ? 1

ENTER MORNING LINE ODDS (1ST #,2ND #)
(EXAMPLE: FOR ODDS OF 9/2 ENTER 9,2)
? 9,2

LAST TIME (MIN, SEC) ?
```

Figure 4. Other categories used in the Enhanced Racing Analysis Package.

AT THE FINISH

How did I do? I ran a series of nine races through the program. It managed to pick a winning horse in *EVERY* race. Most of the time, it picked two of the three fastest horses. Will this make me rich? No. Betting $6 per race ($2 each for the top three picked by the program and betting that each horse would finish in at least third place position) I would have spent $54. I would have won $54.80 (on the average, the payoffs are in the range of $2.20 to $6 for third place). In only two of the nine races did the program correctly choose the winning horse. Not good enough to bet on it for every race (spend $18 to win $6).

On the other hand, eliminating those races running horses with less than two previous races to their credit, leaving four races to bet on, I would have spent $24 and won $28.90. Almost a 20 percent profit (betting on the winning horse, too, would have meant spending $32 to win $32.10).

There is no way I would tell anyone to use this or any other handicapping program to make money. While a professional gambler might use this program to verify his own choices, it isn't infallible. But it *is* a marvelous way to spend an afternoon or evening having fun without spending a great deal of money. Moreover, if you're careful in selecting races you could even end up with a profit for your evening. And not many entertainments can make that boast. I'm definitely going to take this to the track in the future. I might not win a lot, but then, I feel confident I won't lose a lot, either.

My Computer Likes Me (When I Don't Bang on the Space Bar)

Recreational Activities for the 1400LT.

by Bob Liddil

The computer gamer sits by the light of a single reading lamp, hunched over a brain-busting unit of entertainment software. He's been at it for 36 hours now, trying to solve the unsolvable. It's seven o'clock in the morning and time to go to work—no getting around it. He dresses, shaves, showers, shines, then loads his computer into its travel case. For this 1400LT, the fun and games are over. It's back to the workaday world—but only until lunchtime ...

This sleek Tandy laptop is designed for *play* as well as the business or occupational tasks it performs so powerfully. Does a visualization of the Tandy 1400LT as a game computer seem a little off the wall? Well, if you think of IBM PC compatibility, it's not so far fetched at all.

The 1400LT has two limitations with games. The first is the supertwist screen, which translates every color graphic and animation generated by gameware into shades of blue or gray. This slight handicap is coupled with internal workings that allow most graphics to be displayed, setting up a conflict between game pictures as the author intended them and a sometimes scrambled or unusable supertwist version. Most graphics displays work on the 1400 but the quality of reproduction varies, sometimes markedly.

The second limitation is usually an asset, except in packaged game software. The laptops' use of 3.5-inch disks has some manufacturers adding extra media (and extra cost) to the game. Others add extra cost by providing only 5.25-inch disks, making the customer *send in* for the correct media device, often requiring surrender of the original diskette before a new one is issued. The consumer who tries on his own to copy the 5.25-inch disk to a more usable format will often as not run into copy protection, so he has no choice if he wishes to play the game.

These downsides notwithstanding, many games are relaxing, challenging, stimulating or just plain FUN. They can be divided roughly into four categories: public domain and shareware, arcade games (or *twitches*, as the slang goes), adventureware (which includes graphics or animation), and simulations (which model real or imaginary situations, with a bent toward education by play).

Over the last year, I have used my 1400LT exclusively for playing, reviewing, and writing about games that fall into these categories. Here is a selection of entertainment-style software packages that have proven to be good companions for Tandy's premier laptop in hotels, airplanes, train seats and getaway spots as I've traveled America.

> This laptop is designed for *play* as well as business.

PUBLIC DOMAIN

Perhaps my all-time favorite in this category, *Sopwith*, is also one of the best suited for the supertwist. It is a good old-fashioned World War I air flight simulation in which the pilot (player) must master not only the principles of planiversic (my word for two-dimensional) flight, but the dynamics of bombing and strafing as well. Since there are no people involved, just the wanton destruction of property, even the more mild mannered will enjoy flying this little biplane as it pursues its mission to bomb all the buildings, tanks and water towers in a small valley. Included in the challenge are such nice detail touches as getting blasted out of the sky if a bomb goes off too near, or bouncing off the roof of the sky into a terminal spin. A variation provided in the program allows would-be aces to battle their own personal Red Barons, usually unsuccessfully, as has been my experience.

Sopwith is one selection on a diskful of games available as The Programmer's Guild *Personal Portable Pastime Package*. This $12 disk has enough games (good or bad) to satisfy everyone.

Usually available from local or national public domain library duplicating services are a gaggle of PC pinball games, Star Trek simulations, checkers, chess, Monopoly (despite repeated protests from Parker Brothers), and *free catalogs* describing what I haven't. A toll-free number, (800)843-5084, gives you access to a potential 300-plus disk inventory chock full of unimaginable goodies. Definitely worth trying.

ARCADE GAMES

The most impressive twitch I've ever seen played on the 1400 is a *Transformers*-style game called *Thexider*. This American version of a Japanese sensation comes from Sierra On-Line, one of the most respected names in graphics-oriented computer software. In *Thexider*, the player moves a robot through multiple attack scenarios, defending by laser fire or other means against many-shaped nasties trying to do him in. Battlefields are as diverse as mountain caves, cargo areas, and even spaceship interiors. Uniquely, the robot can shape-change (transform) at the touch of a button, providing the player with formidable new ways to trounce his enemies. But sometimes it is the blobs and beasties who do the trouncing, all to the sight and sound of absolute state-of-the-art music and graphics. Plot? There's enough variety in this game to seduce even the most anti-

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ADVENTUREWARE

Whole books (two of them by me) have been written about adventure, and it is difficult to nail down in a single paragraph just what it is. But I'll try. Adventure is a puzzle, usually taking the form of a maze, which the player must solve to win the game. It may be simple, as in *Castle*, a popular public domain game, or complex to the verge of insanity, as are some of the games sold by Infocom. Sitting somewhere in the middle are the relatively consumer-friendly, graphics-based Polarware adventures *Talisman*, *Transylvania*, and *The Crimson Crown*.

Adventures key in on themes. The most popular is the "Princess is kidnapped and needs rescuing" or "The kingdom is in deadly peril and needs rescuing" and "The world/universe is etc., etc." Not to detract from games that have millions of dedicated fans, but variations on these simple themes are more or less endless. The Polarware games are *good* versions of these time-worn plot lines and never fail to be crisp and entertaining, whether to newcomers or veterans. The graphics are 1400LT-complementary, and there are no dull spots. At $19.95 each, they show a respect for the consumer's wallet far above and beyond that of their $40-plus competitors.

Graphics point the way, and the interaction between user and story dictates much of how the action will proceed. The Infocom adventures are graphic-less, relying instead on word descriptions to do the job of pictures, and in their own bailiwick, they are unrivaled. Sierra On-Line is a prime mover in graphics adventures, extending to the next logical step, animation. Their premium program *The Black Cauldron* gives fits to the supertwist screen but is still playable within limits.

Adventureware entertains but can issue mountain-size migraines for those who can't rest with a puzzle unsolved.

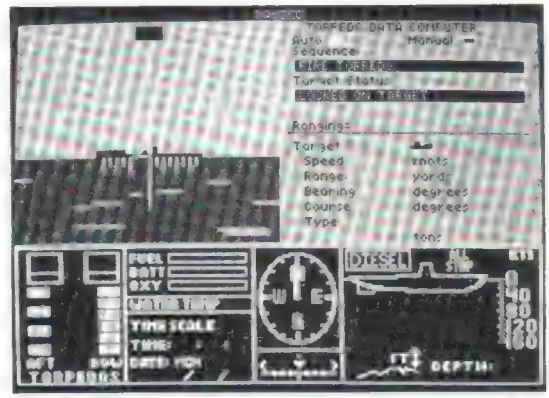
SIMULATIONS

The lines between program types often blur, and it is dangerous to classify a game as a simulation if it is close to the border. But *Tetris*, a game that traveled from the U.S.S.R. to England, then to California before finally coming to me, is an exercise in fitting different shapes together in the most compact possible way. A kid would see it as a form of twitch; an educator would consider it a development tool. I find myself comfortably calling it a simulation, because it fits one of the definitions of that category, the modeling of a real or imaginary situation with a bent toward education.

Tetris brings wondrous high-res static pictures to the screen: high-tech fighter planes, Red Square, a pastoral scene in Gorky Park, hockey—all of these Soviet-oriented. Squarely, or perhaps I should say rectangularly, up the middle of these stunningly beautiful pictures is a vertical playing surface down which all manner of colored squares and right-angled variations of squares fall. The object of the game is to stack as many of them together as possible, leaving the least possible blank space between. The player controls left-to-right movement as the blocks fall, and the results have been quite hilarious.

> Like Chernobyl dust, it grows on you.

The simplicity of this game is no drawback. Like Chernobyl dust, it grows on you, after a while getting inside your head. It is the kind of thing you can play *forever* and not be sorry you did.



An Up Periscope! *screen with periscope up and the Torpedo Data Computer screen indicating that you are within range to fire.*

True simulations need no qualifications beyond what they do. *Up Periscope!* flawlessly portrays World War II submarine warfare against Japan in the Pacific. *The Ancient Art of War* pins all its action on the grasping of strategic truths. As simple as is *Tetris*, that's how complex these two are, but in a user-friendly way. I had less problem navigating the submarine in *Up Periscope!* than I did planning troop movement in *The Ancient Art of War*, simply because my idea of abstract thought is how long I have, at room temperature, to eat a Klondike Ice Cream Bar.

As simulations go, these three are a magnificent cross section of extremes, *Tetris* being easy and long-playing, *Up Periscope!* being interactive and complex, and *The Ancient Art of War* being cryptic and oblique, just the way some like it.

Gaming on the 1400LT can be just as entertaining and rewarding as on full-sized computers. Even with its limitations, there are few games which will not work at all. For best results, explore the Radio Shack inventory, the public domain duplicating services, and the local computer flea markets. There is more to see and use than there is time to do it all.

Manufacturers mentioned

Up Periscope!—$29.95
ActionSoft Software
201 W. Springfield Ave.
Suite 711
Champaign, IL 61820
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GoldText: Taking on the Big Ones

Now edit Gold Card files as large as 500K.

by Mike Nugent

GoldText v2.4 is a ROM-based Model 100/102 text editor designed specifically to work with text files on the SoundSight Gold Card. It looks and feels like the Model 100/102's built-in *TEXT* program, to make it easy to use for those already familiar with *TEXT*.

RAM-INDEPENDENCE

Despite its *TEXT*-like appearance, it differs markedly in less visible ways. Most notably, it works with files directly on the Gold Card, not in RAM. This has many advantages.

For one thing, you can fill your computer's RAM with programs and files and still freely edit Gold Card text files. No need to clear out any of your programs first.

This independence from RAM has another benefit—built-in file protection. That is, since your edit file is not in RAM, a cold start or similar disaster leaves your file intact, safely tucked away on the Gold Card. *GoldText* actually has, at most, 512 bytes of text in RAM at any given time, and it's only a copy of what's on the card. In the extremely unlikely event that data were ever lost, it could be no more than that 512-byte chunk. I've never experienced any data loss, even after forcing cold starts for testing purposes.

> What we have here, folks, is *boilerplate*!

GoldText's most unique advantage, again due to RAM-independence, is that you can edit any size file up to just slightly less than the size of the card's memory. With 256K cards, I can edit a file of up to, say, 250K per card (one humongous *ADRS.DO* file, no?), which can accomodate a rather large mailing list. It's way more than enough to download anything I'll find on any on-line services, so I can download many files without doing the log-on/download/log-off/save/do-it-all-again trip.

RAM-independence even extends to cut, copy, and paste operations. *GoldText* maintains its own paste buffer in the form of a *PASTE.DO* file on the card. Any text cut or copied is put into *PASTE.DO*. Whatever exists in the computer's regular paste buffer is left undisturbed.

Playing with *PASTE.DO* to get a feel for what it will and won't do, I found that it can be edited like any text file by typing things in, deleting with the *DEL/BSKP* key, even performing a *Load* (*F2*) from a cassette, a Gold Card file, and even from RAM (more about that later). What you can't do, of course, is cut, copy, or paste. Attempting those produced an error message and disallowed the operation, though nothing was harmed. You can even rename *PASTE.DO*, but it's not used for pasting anymore.

DEVICE ACCESS

I mentioned loading from RAM. *GoldText*'s RAM-independence doesn't mean it can't access RAM files. Since the computer's RAM is actually a device named *RAM:* (see this month's *DEFUSR*), a RAM file named *MYFILE.DO*, for example, is actually shorthand for *RAM:MYFILE.DO*. *GoldText*'s ability to access any device means it can load from and save to RAM as well.

So you can load a RAM file into your edit file or save your edit file to RAM. Or to and from a Gold Card (device *A:* or *B:*), or a cassette (*CAS:*), etc., or any combination of these. This is a big advantage over *TEXT*, which cannot access other RAM files.

For one thing, it lets you backup your work as you go just by doing a *Save* (*F3*) to any device, with or without renaming the file. This allows great freedom in file-shuffling. The only restriction is that you must change the file name if you save it to the same Gold Card as the file being edited; otherwise you're actually trying to save it to itself, which displays an error message and disallows the operation.

It gets even better. In *TEXT*, when you load another file into the edit file, it's *appended* to the end of the edit file, regardless of the cursor's position within the edit file. *GoldText*, on the other hand, *inserts* the loaded file into the edit file *at the cursor position*, moving existing text down to make room. In effect, you're *pasting* the loaded file into your document.

What we have here, folks, is *boilerplate*! Just put your often-used phrases, paragraphs, letterheads, printer commands, or whatever into separate files on the Gold Card (or any device). Then when you want to slip one into your document, put the cursor where you want it inserted, press *F2* (*Load*), type it's file name, including device specifier if necessary, and press *ENTER*. Bingo! It's merged in.

SOME DRAWBACKS

The foregoing advantages make *GoldText* desirable even for small files. It's not without a few minor drawbacks, however. Some may be unavoidable due to the special requirements

```
Pg:1      -Gold Text Directory-   72.25K
[R-DASM.DO]GTNOTE.DO GTREVW.DO PASTE.DO
 HAPPY.DO  NEW.DO     YEAR.DO   DAD!.DO
 -.-       -.-        -.-       -.-
 -.-       -.-        -.-       -.-
 -.-       -.-        -.-       -.-
 B:Active     32.25K
 Ram L/Fl Move Util K/fl Edit Rnam Menu
```

Figure 1. The GoldText *directory shows .DO files on the currently active Gold Card.*

```
F1 = Find      F2 = Load      F3 = Save
F5 = Copy      F6 = Cut       F7 = Select
F8 = File Doc and Return to Main Menu
PASTE = Insert Save/Cut text at Cursor
PRINT = Print Current Screen
SHIFTED PRINT = Print Entire Document

Any Key to Return - Enter for More HELP
```

Figure 2. The first of three help screens called up by pressing the LABEL *key.*

```
CTRL PLUS              A - Backup Word
B - Advance Screen     C - Cancel Command
D - Cursor Right       E - Cursor Up
F - Advance Word       G - Save Document
H - Del Prev Char      I - Same as TAB
K - Same as PASTE      L - Same as SELECT
M - Carriage Ret       N - Same as FIND
Any Key to Return - Enter for More HELP
```

Figure 3. The second help screen shows the CTRL *key equivalents of function keys and special keys. This list continues on the third screen.*

involved in handling extremely large files while using minimal RAM.

The first thing you notice is the sometimes funky screen formatting. Certain operations leave the display looking different than *TEXT* would. Line breaks occur in unusual places and can change when scrolling. Once you adapt, it's not a problem. *GoldText* documentation explains what to expect and why it happens.

It's partly a matter of speed. Knowing how long *TEXT* can take to scroll to the bottom of a large RAM file, you can imagine the time required on a 200K-plus Gold Card file. So routines had to be developed to enhance the speed. And those routines, in turn, require separate display calculation routines (the native M100/102 ROM routines are too slow). This results in some guesswork on the part of the program, as Gold Card sectors are loaded in one at a time. It's a tough problem that I think was well handled. Top-to-bottom scrolling, text-searching and such are quite fast, though necessarily slower than in a completely RAM-based system.

One minor annoyance is that *GoldText* overrides the computer's automatic power-off feature, so when operating on batteries, you must keep that in mind. If you leave the machine, be sure to exit *GoldText* first or turn the machine off.

Another thing is that newly-created files always go onto the first available page of the Gold Card directory. You can move a small file into RAM and then load it back into the desired directory page, but a big file won't even fit into RAM. Alternatively you can first create the file with *GolDOS* or *TEXT* and then use *GoldText* to edit it. I'd really prefer that *GoldText* simply prompt me for the desired page when creating a file.

Unlike *TEXT*, the *Find* (*F1*) command gives no message if the target text isn't found; it just leaves you at the bottom of the file rather than the point at which you started the search.

When you exit a Gold Card file, *GoldText* returns you to the Model 100/102 main menu instead of the *GoldText* menu. (Maybe there's a programming reason for this?) It's a bit bothersome, but it takes only a couple of keystrokes to re-enter *GoldText*.

All in all, just some minor quirks.

AN ACTUAL BUG

I encountered only one actual bug. It occurs when using special graphics and foreign language characters, where the eighth bit is set (ASCII values above 127). The computer's display routines conflict with *GoldText*'s. Nothing in the file is damaged or lost; it simply confuses the cursor positioning routine. Most people aren't likely to use such characters, but the developer says it's a simple matter and will be fixed in any future releases.

DOCUMENTATION

GoldText is so *TEXT*-like that there's little to learn. Consequently the manual is small, 6 pages of 8.5x11-inch good quality paper. It could even be smaller, except it also explains some technical information about the program. Though slightly confusing in spots, it's certainly thorough enough to get you up and running easily.

BUILT-IN HELP

When you press the *LABEL* key, you'll notice a large departure from *TEXT*. Rather than turning on the labels, *GoldText* displays three screens of help information describing the function key operations, *PASTE*, *PRINT*, *SHIFT-PRINT*, and best of all, the *CTRL* key combinations that mimic function key and arrow key operation.

I could never remember such things as *CTRL-F* acts like *SHIFT-RIGHT ARROW*, advancing the cursor one word, or that *CTRL-K* works like the *PASTE* key. And I didn't want to carry the M100 owner's manual around with me. But with *GoldText*'s on-line help, it's no problem. By having help available at the touch of a key, some of the *CTRL* key combinations have actually sunk into my brain. I like that!

SUMMARY

GoldText's RAM-independence, device access, boilerplating abilities, and ease of editing massive files directly on a Gold Card make it powerful and versatile. TEXT never had it so good. ❑

Manufacturer's Specifications

Gold Text ROM--$75.00
SoundSight MBM, Inc.
225 West Broadway, Suite #509
Glendale, CA 91204
(213)463-9457 or 463-9464

KILL.BA

Kill a File From the Model 100/102 Menu.

by Paul Globman

A nice feature of the Tandy 200 is the ability to place the cursor over a file name *at the menu* and press a function key to kill the file and free the RAM that it occupied. The Model 100/102 doesn't allow that ... until now.

The two-line *BASIC* progam in Listing 1 gives your Model 100/102 the ability to kill files from the main menu. Just type it in and save it as *KILL.BA*. Then to use the program, place the cursor over any RAM file that you wish to delete from memory, type *KILL.BA* and press *ENTER*. ZAP—that file is gone!

```
1 AD=64929+2*PEEK(65ØØ6): AD=PEEK(AD)+25
6*PEEK(AD+1): FOR X=3 TO 1Ø: F$=F$+CHR$(
PEEK(AD+X)): IF X=8 THEN F$=F$+"."
2 NEXT: M$="Menu"+CHR$(13): AD=6545Ø: PO
KE AD,1Ø: FOR X=1 TO 5: M=ASC(MID$(M$,X,
1)): POKE AD+2*X,Ø: POKE AD+2*X-1,M: NEX
T: KILL F$
```

Listing 1. KILL.BA. *This program allows you to kill files from the main menu.*

For even easier use, you can make the file invisible and remove the *.BA* extension, so the command may be executed by typing only *KILL* and pressing *ENTER*. This gives the appearance of *KILL* being a built-in command rather than a user-written program.

```
1 AD=64929+2*PEEK(65ØØ6): AD=PEEK(AD)+25
6*PEEK(AD+1): POKE AD,PEEK(AD)OR8: POKEA
D+9,32: POKE AD+1Ø,32: MENU
```

Listing 2. CMD.BA. *This program makes* KILL.BA *invisible to the menu, but still lets you use it.*

One way to make a program invisible and remove its file extension is to use a program such as *CHANGE.BA* (from CompuServe's Model 100 Forum). Another way is to use the one-line program in Listing 2. Type it in, check it carefully, and save it as *CMD.BA*. DO NOT run this program from *BASIC*! To use it, go to the main menu, place the cursor over *KILL.BA*, type *CMD.BA* and press *ENTER*. Watch *KILL.BA* disappear. Don't worry—it's still there. It's invisible and can only be accessed by typing *KILL* at the menu. You can now kill any RAM file by placing the cursor over it and typing the command—almost as good as function key operation. I didn't bother to include an *Are you sure?* prompt, since the action needed to kill a file is specific and deliberate. ❑

How Do You Read a ROM?

The Vast Wasteland of 255's.

by Douglas L. Jones

All kinds of disassembler programs are available for the Model 100/102. I immediately wrote one when I acquired my 100, almost 4 years ago. (Several are a lot faster than mine so no kudos there!)

I'm sitting with my laptop in the kitchen table (a cold brew nearby), watching television and wondering how do I disassemble the $99.95 SUPER-DOOPER-ROM chip that I

```
1Ø REM ROMRD.BA
2Ø REM
3Ø REM DOUGLAS L. JONES
4Ø REM 2271 NORTH MILL ROAD
5Ø REM NORTH EAST PA 16428
6Ø REM
7Ø REM VER 11/Ø8/88
8Ø REM
9Ø DATA 243, 58, 69, 255, 246, 1, 5Ø, 69
, 255, 211
1ØØ DATA 232, 42, -1, 126, 35, 34, -1, 5
Ø
11Ø DATA -2, 58, 69, 255, 23Ø, 254, 5Ø,
69, 255
12Ø DATA 211, 232, 251, 2Ø1, -3
13Ø DEFINT A : AD = Ø : AC = Ø
14Ø DD = VARPTR(AD) + 65536 : CC = VARPT
R(AC) + 65536
15Ø DH = INT(DD/256) : DL = DD-256*DH
16Ø CH = INT(CC/256) : CL = CC-256*CH
17Ø D$ = CHR$(DL) + CHR$(DH) : C$ = CHR$
(CL) + CHR$(CH)
18Ø READ X : IF X = -1 THEN P$ = P$ + D$
 : GOTO 18Ø
19Ø IF X = -2 THEN P$ = P$ + C$ : GOTO 1
8Ø
2ØØ IF X = -3 THEN 21Ø ELSE P$ = P$ + CH
R$(X) : GOTO 18Ø
21Ø P = VARPTR(P$) + 65536 : PR = PEEK(P
 + 1) + 256*PEEK(P + 2)
22Ø CALL PR
23Ø PRINT AD-1;AC; : IF AC>29 THEN PRINT
 TAB(1Ø);CHR$(AC) ELSE PRINT
24Ø REM OPTIONAL FASTER LINE: IF AC > 29
 THEN PRINT CHR$(AC);
25Ø IF AD <= 32768 THEN 22Ø ELSE STOP
```

Listing 1. ROMRD.BA. *This is the even more complicated program, which disassembles ROM code.*

bought, which sits snugly in the little compartment. How does that thing really work? What routines in it can I use to MY advantage?

I think I am sorry I figured out how to do it. There is indeed *some* code, but of the first 12,000+ bytes I've looked at, nearly 99 percent contained decimal 255's. A pacifier. A nothing. SHAME! SHAME! ROM program vendors.

Type in the little *.BA* program *ROMRD.BA* (Listing 1). It will not let you down. It faithfully allows you to peek at your expen$ive ROM and get an idea of what is going on.

Clever programmers, such you you, can easily incorporate this program as a subroutine into your favorite disassembler program. I leave that up to your expertise.

(HINT: *AD* minus 1 (*AD-1*) contains the address: variable *AC* contains the character read. A reminder, these have been declared integer functions.)

How does that do that?

A very small and simple assembly language routine entered in the program in the *DATA* statements (shown in assembly in Listing 2) is concatenated (shoved) into variable *P$*. The dynamic addresses of *AD* and *AC* have been previously computed and are included during the "manufacture" of *P$*. Each time a new byte of data is required, a call to the address containing the string is done. The result, *AD* contains the last read address plus 1. *AC* contains the byte just read. The assembly language routine turns on the option ROM, gets one byte of data, increments the address pointer, turns off the option ROM, and returns back to *BASIC*.

```
                ORG     VARPTR(P$)+1
;*********
STORE:  EQU     FF45H
;*********
                DI
                LDA     STORE
                ORI     Ø1
                STA     STORE
                OUT     E8H
                LHLD    AD
                MOV     A,M
                INX     H
                SHLD    AD
                STA     AC
                LDA     STORE
                ANI     FEH
                STA     STORE
                OUT     E8H
                EI
                RET
```

Listing 2. The assembly language program used with ROMRD.BA.

Bibliography: Inside the Model 100, *by Carl Oppedahl. Weber Systems, Inc., p. 26.*

Repairing a Tandy CGP-115 Printer/Plotter

by Hal Boulware

I think the reason Radio Shack discontinued the CGP-115 is because it had a flaw in it that kept causing it to stop line feeding properly. I have found the cause of this problem, and here is how to fix it. On each side of the print head there is a quite small white nylon gear, press-fitted on a steel shaft driven by the larger gear that feeds the paper. This gear had too small a hole through it, and when it is pressed on the shaft, it hangs up, causing it to cease working. You will need to order this little gear through Radio Shack, part #ARA-0564 at $2.00 plus $1.50 shipping. Order through your RS store, or directly from: Radio Shack, National Parts Warehouse, 900 East Northside Drive, Fort Worth, TX 76102. They are prompt in shipping, about two weeks or less. You will probably need two of these gears, one for each side of the print head. The one on the right feeds the paper, and one on the left has to do with changing the pens.

Turn CGP-115 over and you will see five small Phillips head screws down deep inside five depressions. Notice two more near the front of the printer flush with the surface. Do not remove these two screws, since they hold the print head in place and need not be removed. Remove the other five screws, and gently pry off the cover of the CGP-115. Inspect both sides of the print head and you will see the two nylon gears. Turn the larger gear that engages it and you will see if the small one is bad. It should rotate smoothly. If it hangs up or does not rotate properly, it is bad. If it is bad, pull it off. Clean the steel shaft with alcohol or lacquer thinner. With a #53 drill bit in a pin vise, ream the new gears out, which will ease the pressure. Then when the shaft is dry and clean, put a small amount of crazy glue on the shaft and press on the new gear. Be careful not to get any glue on the gear teeth. It will dry in a few seconds, and your printer is all fixed and good for a long time. Mine has been working for over four years after doing this, and I have repaired several more for friends, without any more trouble. If your printer has been inoperative for a long time, your pens probably have dried out. This is no problem. See my article on them in *Portable 100*, May '88.

If any of you have a PC-2 printer/interface, you can fix it with the same little nylon gear in the same way. This printer/interface was discontinued quite a while ago, for probably the same reason. If you haven't used your PC-2 printer/interface for some time, it will no doubt need a new battery pack, or you can make one up yourself with the Radio Shack AA rechargeable batteries. Use the yellow-jacketed ones that can be soldered together end to end, not the purple jacketed ones. The cover comes off the PC-2 printer/interface with just a few screws, and you will see the nylon gears and the battery pack, which has 5 batteries in it, and which will probably not take a charge anymore after sitting around for a long time.

Hope this information will get your CGP-115 back working again. If you have any trouble getting the CGP-115 to change pens properly, get in touch with me; this is no big problem, and I can tell you what to do to fix it. H. E. Boulware, Route 1 Box 9, Vichy, MO 65580 (314)299-4420. I will be happy to assist you. ❑

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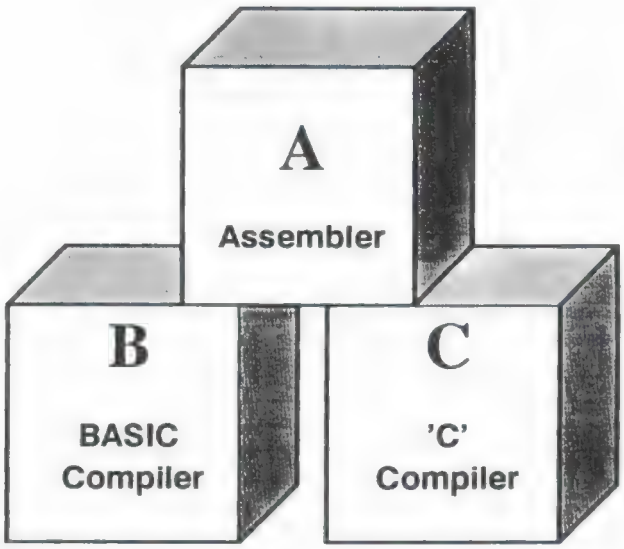

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BASIC Bits

A source for Model 100/102 public domain software.

By Thomas L. Quindry

My November '88 *"BASIC Bits"* column on public domain software has opened a discussion about legality of my distributing of the disk of unrestricted software. Apparently, one program I described has not been explicitly released to the public domain. In addition, I did not mention that some of the programs were available on a particular professional database service (such as CompuServe, GEnie, The Source, or Delphi), and that it was the original source of distribution. Not wishing to get lost on specifics, the following is my open letter of response. I invite you, the reader, to provide your comments and feelings on this issue.

In the next column, I will provide some of the answers I receive. Keep in mind that you have only about a week or two from when you read this column if you want to respond in time for the next column. Send responses to my home address, 6237 Windward Drive, Burke, VA 22015. Anonymity will be respected if requested. Keep your comments short and send your comments to your professional database service also, if you subscribe to one. I have suspended my normal topics in *"BASIC Bits,"* and if the issues cannot be adequately resolved, I may not continue the column.

AN OPEN LETTER

Dear Software Author,

I understand that my November column on public domain software for the Model 100/102 has caused a bit of consternation on the part of you as a software author, *Portable 100*, and with me for that matter. I would like to get this straightened out and perhaps bring about some solution to the issues, which also may be of concern to CompuServe, GEnie, the Source, Delphi, and Club 100. I solicit your help in this matter.

WHY I WRITE FOR *PORTABLE 100*

I have written software articles since November, 1980, for the TRS-80's, Model 100, and MS-DOS computers in *80 Micro, PC Resource, Portable 100, PCM, 80-US* (later called *Basic Computing*), and *PICO* plus a couple other magazines. I am not a full-time writer. I write for my enjoyment and consider it my "safety valve" against the everyday stresses of my full-time job. It also supports my "computer habit" and keeps me current, at least with computer items common to the home user.

In writing for *Portable 100*, I have accepted a fee per article that is about half what I could get for similar effort in a more affluent magazine like *PC Resource*. I do this because I believe in the importance of keeping the Model 100 (and the Tandy 200) a viable computer. And I want *Portable 100* to succeed. Without a magazine behind the Model 100, there would be no place for advertisers to sell their products. Without new products and applictions, the Model 100 would go the way of the TRS-80 line as a has-been computer, even though the TRS-80 (even the Model I) is still used and loved by many who have useful applications for it. In writing for *Portable 100*, I want to bring my expertise to improve the magazine in areas that I can, through writing articles and programs, and also by helping to disseminate public domain programs to stimulate interest in others.

> I see two issues... whether this is a legal and ethical way to get programs to readers.

I am much encouraged with the direction *Portable 100* has taken recently, especially with the addition of Mike Nugent to the staff. Advertising is up and the quality and size of the magazine has taken a decided turn for the better. This can only help you, me, and all others who own and want to get the most utility out of their Model 100 or 200 computer.

I want to make sure my name remains untarnished over this, and I will bend over backwards to make sure that I don't do anything in my column that disturbs you or others with regard to the distribution of unrestricted software.

THE ISSUES

I see two issues. The first deals with my distribution of disks containing public domain programs and whether this is a legal and ethical way to get programs out to readers of *Portable 100*. My reasoning in distributing a disk is that an article on public domain programs is hardly worth the paper if readers cannot get the programs discussed. Most computer users, Model 100/200 users included, do not know how to download programs, are afraid to try, or simply cannot afford to subscribe to a service like CompuServe, GEnie, the Source, Delphi, etc., or make long distance calls to download programs. I do not subscribe to these services for reasons that will be apparent.

I don't distribute the Model 100 disks for profit. Few readers (averaging fewer than thirty each month) order a disk. But knowing it is available if they want it keeps the interest up and gives readers a reason for reading the article. Up to now in my column, I haven't mentioned the availability of these programs on CompuServe or GEnie. Having observed from afar the controversy a couple of years ago with PC-SIG over the distribution of their software by others claiming "PC-SIG" disks, and with bulletin boards advertising "software downloaded from CompuServe," I have tried to steer clear of seeming to make those claims. After all, I did not get the November programs from CompuServe or GEnie though I know many are there.

In 1987, someone I talked to from PC-SIG was concerned with people distributing a "PC-SIG" disk that kept the exact format, including directory listing of the programs. PC-SIG considers their organization of the disk as proprietary, not the programs on it. They had no problem with someone distributing the programs as long as they did not give someone the impression that they were "PC-SIG" disks. In fact, PC-SIG had received irate calls from people expecting support from PC-SIG for the disks they had purchased from someone else. I also understood at the time that CompuServe was having a similar problem and came to the same type of resolution.

I downloaded many of the programs I've written about from local bulletin board systems, except where noted from Club 100. *XMDPW5*, for example, though

it originated on CompuServe I suppose, is on three local BBS's. I got *XMDPW5* last December from one of them.

PD OR NOT PD?

Considering that the programs were unrestricted, I was operating from this principle and was primarily interested in getting these programs out to those who could use them. I assumed (perhaps incorrectly) that the authors of these programs had given permission for true dissemination as occurs with most MS-DOS software. Most of the Model 100 programs have the authors' names but no addresses other than a CompuServe code. Many of the programs I plan to talk about were written two or three years ago, and contacting those people may not be possible.

I had concluded I didn't need special permission since the professional database services do essentially the same thing as I, even though there is a definite large-scale profit motive there. For all the writing I've done since 1980, the money I have gotten on the average has not been more than 2 percent of what I get working in my full-time job. This year will be in the red. This is small scale.

I have written public domain and shareware programs for the Model 100 such as *SCRIPY* and *LENGTH*, made into articles for the September '87 issue of *Portable 100*. Those programs were placed around the country on bulletin boards and services such as CompuServe and GEnie prior to my article in *Portable 100*, though not necessarily by me.

I intended them to be available . I even stated in my article that they had previously been placed in the public domain. I have no problems with them being on CompuServe or GEnie, though I haven't received any direct benefit from this. I am just happy they are there for anyone to use. For the record, I openly give permission for these programs to be distributed in this way and on disks with other public domain software.

FAR-REACHING CONCERNS

The issue is more far reaching than individual authors, though. How do we tell whether these programs are considered public domain at all? Looking through an old Model 100 CompuServe Forum Library catalog I bought a couple of years ago, I could not even find the words "public domain," though it has been pretty much accepted practice that the programs are used in the public domain. And the controversy created a couple of years ago by CompuServe seemingly trying to restrict the distribution through other sources resulted in a revolt by software authors—who interpreted this to be that CompuServe considered them their property. Are they the property of the original database service? I thought the issues were cleared up then, and that they weren't the property of the databases or the companies.

Must each bulletin board around the country that has Model 100 software on it ask permission from an author if the BBS charges a nominal fee to its users to get on the BBS? How does each BBS sysop get in touch with these authors with no postal address? Usually, because of the Model 100/200 limited memory, minimal information is given and rarely is there a home address. Most times, the words "public domain" are not there.

With MS-DOS public domain and shareware software, the answers seem a bit clearer. If an author wishes to put restrictions on his program he does it. The ability to archive several programs into one file in MS-DOS assures that all the parts stay together and that the message isn't lost. Limited memory in the Model 100/200 has made things a bit different. Documentation files may get separated from the actual programs.

> How do we tell whether these programs are considered public domain at all?

THE LEGAL CONSENSUS

According to one lawyer specializing in software copyright, the legal consensus on the distribution of programs like these is that for a program to be considered public domain, either the program or its documentation must specifically state that it is public domain. However, even if it is not marked as public domain, if it is uploaded by the author to a bulletin board or database service such as Compuserve for the express purpose of making it available for downloading to others who use the service, and without specifically written restrictions to its distribution, it is implied that the availability and further distribution of the program is not restricted. That is, other bulletin board services and persons distributing disks, even those charging a fee for this service, can distribute the programs legally. The author of the program, however, still retains all rights to his program, and if he does not like it distributed in certain ways, he can restrict this method by serving notice either in writing or orally; though written notice is certainly the better. For example, "Specifically for the users of CompuServe" in the program's documentation, would restrict distribution only through CompuServe.

So what we have with the programs called public domain through this column are two similar types of programs. Some are public domain and some are copyrighted programs where distribution has been implied to be not restricted. As stated previously, many of these Model 100 programs have no statement as being public domain, but then again, have no restrictions on further distribution through other databases, bulletin boards, or disk. I tend to describe these as public domain programs, though my definition is not entirely correct.

A POSSIBLE SOLUTION

I want to do what is right and comfortable to all. My *"BASIC* Bits" column on public domain software can be beneficial not only to the readers but to the database services as well. With proper communication channels between me, as the author of the column, and the databases, I could adequately promote what is available on the databases and yet provide the programs to readers as a sample of what they can get there. (I already enjoy this privilege with Club 100.) I have no way to cover all the hundreds of programs on each service, so what I cover can be seen as an advertisement or enticement to the reader to join these databases (Club 100 included) and get what else is available and of interest.

A March '88 article I wrote for *Portable 100* tells how to use *TELCOM*. Future columns can provide more specifics to help readers in getting on the specific databases. How about it CompuServe? GEnie? The Source? Delphi? How about giving me some free access on a continual basis so I can accomplish this for *Portable 100* and give you something of value, too? It should clear up much of the "author permission" problem, as then the column becomes sanctioned by the databases and gives the authors more a sense that their programs are being distributed for the common good. For starters, let's say each of you granting me access of two free hours a week or even only two free hours each month so I can do this? It is not economically feasible for me to pay for the services and afford to write the column in this way given the low rate of financial return. Let's keep the Model 100/200 interest alive for a few extra years at least. You depend on it, *Portable 100* depends on it, advertisers depend on it, the readers depend on it.

Editor's Note: For more on this issue, see Phil Wheeler's letter in this month's "I/O" (pp. 4-5).

Laptop Protectors

Electronic Specialists, Inc. has released the *Pocket Protectors*, a series of pocket-sized laptop and portable spike/surge protectors.

The *AC Power Pocket Protector*, combining filtering and high-capacity spike/surge suppression, offers 39,000 surge amp suppression to handle the wildest AC power encountered on the road. Price of this item (LTP-101) is $64.95.

The *Modem Pocket Protector* combines multi-element spike suppression with RF filtering and Balun noise filtering. This item (LTP-201) retails for $45.95.

For further information, contact Electronic Specialists, Inc. 171 South Main Street, Natick, MA 01760 (617)655-1532. *Or circle #66 on your Reader Service card.*

The Modem Pocket Protector *combats spikes and noise.*

New Hope for "Unsociable Computers"

Astro Systems, Inc., has released its 5.25-inch family floppy drives. The *Astro EXT-140LT*, a 5.25-inch 360K external drive for the Tandy 1400LT laptop can read, write, and format 5.25-inch diskettes. It plugs into the 1400LT's external drive connector and will NOT take up an expansion slot.

The EXT-140LT external drive comes with power supply, connector cable, and utility software. Suggested retail price is $345.00, with one-year warranty. For further information, contact Astro Systems, Inc., 807 Aldo Avenue, Suite 106, Santa Clara, CA 95054 (408)727-5599. *Or circle #64 on your Reader Service card.*

Advanced Racing Handicapping Software

Software Exchange has released racing handicapping software for thoroughbred, harness, greyhound, and quarter horse races. The programs use the information found in the racing programs, including race length, post position, speed ratings and variant, times, odds, class, positions at the one-eighth, one-half or three-quarter, stretch positions, and finish positions. A maximum of seventeen data entries per horse or dog, about ten minutes of typing per race, are needed. It allows data re-entry if you make typing errors. All programs have proven track records: they've picked winners in the money (win, place or show) 70 to 80 percent of the time. Each program includes easy-to-follow instructions, and results may be printed on a line printer.

The *Advanced Thoroughbred Racing System*, *Advanced Harness Racing System*, and *Enhanced Quarter Horse System* are available for $64.95 each; the *Advanced Greyhound Racing System* is priced at $74.95. (Add $3.00 S&H.) The programs are available on cassette or diskette for the Apple II+, IIc, IIe, IIgs, Macintosh; Atari 130XE, 400, 600, 800, 1200, XL; Atari 520, 1040ST; Commodore 64, 128; IBM PC, PCjr, XT; Tandy 1000 and compatibles (5.25-inch or 3.5-inch disk); and TRS-80 Model 100/102/200 (cassette or 3.5-inch disk). For further information, contact Software Exchange, 2681 Peterboro Road, P.O. Box 5382, West Bloomfield, MI 48033 (313)626-7208 (orders only: (800)527-9467). *Or circle #67 on your Reader Service card.*

"Glitch" Information from Electronic Specialists

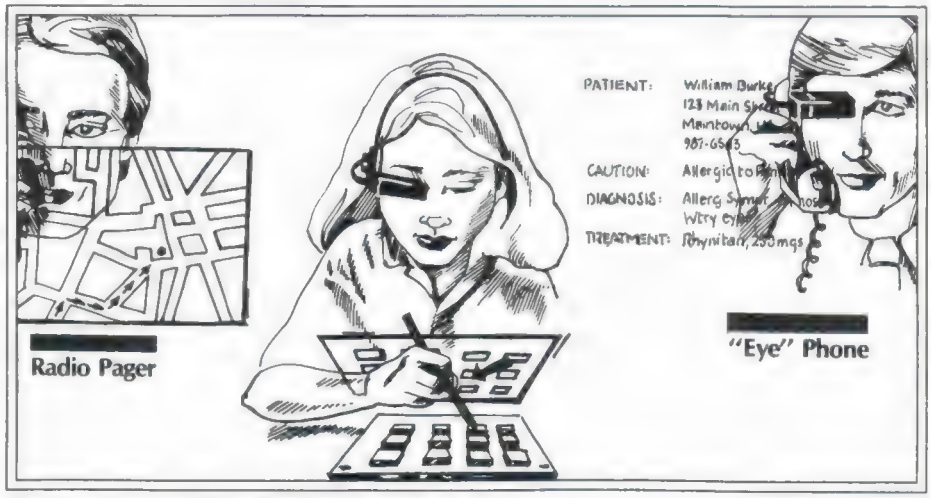
Electronic Specialists, Inc., is making available a free reprint entitled *Protecting Your Computer From Power Line Disturbances*. Written to inform the average computer user about various electrical power problems, the article gives examples of effects of power line disturbances and some common steps that may be taken to protect your computer.

For further information, contact Electronic Specialists, Inc., P.O. Box 389, 171 South Main Street, Natick, MA 01760 (800)225-4876. *Or circle #71 on your Reader Service Card.*

Looks like a Headset, Acts like a 12-Inch Display Screen

Reflection Technology, Inc., of Cambridge, Massachusetts, has released the *Private Eye*, a display that provides the image of a 12-inch monitor in a miniature package weighing less than two ounces. The display typically draws 320 milliwatts and can be battery-powered for portability. Held to the eye or mounted on a headset, the Private Eye displays 720 x 280 pixels, which can be formatted as 25 lines with 80 characters per line. The image appears approximately two feet away from the viewer's eye.

The Private Eye does not occupy the viewer's full field of vision; therefore the user can receive information from the display while operating other equipment or performing additional tasks. Potential applications include handheld computers and industrial instruments, pocket FAX receivers, radio pagers, and novel video games. Several models are available, prices starting under $100.00. For further information, contact Reflection Technology, 171 Third Street, Cambridge MA 02141 (617)547-2422. *Or circle #65 on your Reader Service card.*



The *Private Eye* puts a 12-inch display screen on a headset.

DEFUSR appears monthly to answer your questions about Tandy notebook computers.

Send your queries to: DEFUSR, PORTABLE 100,
P.O. Box 428, Peterborough, NH 03458-0428.
Please enclose a stamped, self-addressed envelope for our reply.

DEVICE ADVICE

I have some old Tandy commercial software on tape. The programs are written to transfer data to and from cassette files. Is there any way to make the programs transfer files to and from disk instead?

Eileen Schwartz
Brookline, MA

Cassette-based programs can often be made to work with disk drives. Machine language (.CO) programs are difficult for non-programmers to modify, but BASIC *programs are relatively easy.*

It's usually a simple matter of changing the device specifier in any OPEN *statements. For example,* OPEN "CAS:ACCN.DO" FOR INPUT AS 1 *opens a cassette file to be used as input data for the program. The device specifier,* CAS:, *tells which device contains the file* ACCN.DO *(in this case, the cassette). To get the input data from a disk file instead, just change the device specifier:* OPEN "0:ACCN.DO" FOR INPUT AS 1. *(Most disk operating systems use* 0: *[zero] to specify the disk drive.)*

Output files work the same way. To store output data on disk instead of cassette, change a statement such as OPEN "CAS:RESULT.DO" FOR OUTPUT AS 2 *to* OPEN "0:RESULT.DO" FOR OUTPUT AS 2.

Also change any CLOAD *statement, which tells the computer to load another program from tape. And if there's an* R *after the statement, the computer runs the program after loading it. Statements like* CLOAD "PF.BA",R *(or* RUN "CAS:PF.BA"*) should be changed to* LOAD "0:PF.BA",R *(or* RUN "0:PF.BA"*). Likewise, change any variations of the* CSAVE *statement.*

Using device specifiers, you can redirect data to and from other devices, like the RS-232 port (COM:), *modem* (MDM:), *Booster Pak* (R:), *and the Gold Card* (A: *or* B:). *Even your computer's memory is a device* (RAM:). *When no device is specified, the computer assumes it to be* RAM: *(i.e.,* MYFILE.DO *is really just the computer's shorthand for* RAM:MYFILE.DO).

Okay, now for the bad news. Tandy's DOS (disk operating system), FLOPPY, *doesn't allow for disk access from* BASIC *programs. The good news is that every other DOS I can think of does allow it:* TS-DOS, Disk Power, *and* POWR-DOS *come immediately to mind. Acroatix, by the way, has very generously released* POWR-DOS *(for the PDD-1 only—there is no PDD-2 version) into the public domain. It should be available on our Portable BBS as soon as we can find time to put it up. It's available for downloading right now in GEnie's Laptops Software Library and CompuServe's Model 100 Forum.*

-MN

I have a Tandy 200, so I cannot use the assembler for the M100/102 from Tandy.

STICK IT TO YOUR DOCUMENTS

I'm looking for information on how to embed DMP-130 printer commands of the type *(27)(xx)* in documents prepared in the *Word* application of the Tandy 600. Can you help?

Walter L. Schleyer
Swarthmore, PA

Word 3.0 *lets my 1400LT embed characters by using* ALT *key combinations. To produce the* ESC *character [*CHR$(27)*], for example, I first lock down the* NUM *key and then press* ALT *while typing* 27 *on the numeric keypad. When I release the* ALT *key, the* ESC *character appears in the text as a [watch for a left arrow here!!!!!] character.*

Lacking a Tandy 600, I tried this procedure on a Zenith ZP-150, whose Microsoft Works *software is remarkably similar, if not identical, to that of the T600. I found that its version of* Word *accepts the* ALT *key method in general, but it won't allow the* CHR$(27). *When you try,* Word *thinks you pressed* ESC, *so it displays the option menu at the bottom of the screen. It might work differently on the T600; you'll just have to try it. If not, there's another way.*

You can use BASIC *to create a small text file containing the codes you want and merge it into your document. To create the special file, enter* BASIC *and type the following program:*

```
10 OPEN "EMBED.TXT" FOR OUTPUT
AS 1
20 PRINT #1, CHR$(27);
```

Press F2 *to run the program; then type* SYSTEM *and press* ENTER *to leave* BASIC.

Now open your Word *document and place the cursor where you want to embed the* ESC. *Press* ESC, *then* M *(for* Merge*), and type* EMBED.TXT *and press* ENTER. *The small file containing the* ESC *() character will be inserted into your document. Thereafter, to embed it again, you can either perform another* Merge *or just select the you already inserted,* Copy *it to the scrap buffer, and then* Insert *it wherever you like. Once you get the hang of it, you could create several different printer control files (one for each printer control) and merge them into your documents as needed.*

For more information on control codes for

your printer, see "Printer Control with the Tandy 600 Laptop Computer" (June '88).

-MN

BLUES IN THE KEY OF F1

I use the *TELCOM* program in my Model 100 very frequently and it is very irritating having to press the *Find* key each and every single time I want *TELCOM* to search through *ADRS.DO* for a phone number. (Sometimes I have to make 20 calls in the space of 15 minutes). Is there any *POKE* command (or any other way) I can use to automatically have *Find* inserted after the *Telcom:* prompt (e.g., *Telcom: Find*) whenever I need a new number? I'd be happy if I could arrange it so that I could hit any key and the word *Find* would appear after the colon.

Help me overcome the *Find* key blues. Thanks for your help. *P100* is a great magazine!

Dave Terwelp
Rock Hills, IL

Gosh, I don't have a solution for that one, Dave. Anybody out there have any ideas?

-MN

A TANDY MERGER?

In response to your request for "HELP" for Dennis W. Hagon of Owosso, MI (June '88, *DEFUSR*) concerning the availability of commercial programs providing integration of the disk/video interface with the Model 100, I could not find any commercially available programs either. My recourse was to write "Merge" programs which modified original programs already available from Tandy and publications such as yours. The resulting programs provide the integration of operations of the disk/video interface, the monitor, and the Model 100.

With a modified (Merged) program, I am able to run segments of larger programs than would otherwise fit in my 32K RAM. I can store 160K-plus of data per disk drive, and I can direct the Model 100 to process the disk data as if the data resides in the Model 100's RAM.

If Dennis and/or any other reader would have an interest in these "Merge" programs, they may contact me at the address below.

Thank you for your informative *DEFUSR* department, and I am looking forward, as always, to the next issue. *Portable 100* is one of the best computer publications I receive.

Jesse G. Dickinson, Jr.
5600 N. Lincoln Ave. #29
Chicago, IL 60659

Thanks for the assist!

-MN

MORE (DISK) POWER TO YA!

I am currently using the *Disk Power* DOS with the PDD-1 and the *Scripsit 100* word processing program on the Model 100. My problem is that every time I use the DOS, I am forced to go back and reload *Scripsit*, even if it is still resident in memory. I realize that the DOS is probably occupying some of the same memory that the *Scripsit* program needs, but I thought that *Scripsit* would take this into account and load past the DOS space. I have essentially the same problem with the *Text Power* word processing program in that it will not load properly as long as *Disk Power* is loaded. What do I need to do? Do you know of a superior DOS for the PDD-1 and Model 100?

I have found that *Portable 100* provides me with more useful programs and information for the Model 100 than *PCM* does now. I would like to see you incorporate the bar code readable format that *PCM* uses, though. And many thanks for coming up with some of the back issues!! Keep up the great job you are doing and I appreciate any help you may be able to provide on my problem.

Marc Freeman
San Antonio, TX

Disk Power *resides in low memory, not high memory. It must be absolutely the first program loaded, so let's get a clean start. Backup any important files, cold start your machine, and then load* Disk Power. *As long as* Disk Power *is loaded first, you should have no problems with* Text Power.

As for Scripsit, *Ultrasoft says when you first load it, skip step 4 of the "Special Loading Instructions" on page 5 of the Scripsit manual. This will leave* CORTNS.CO *visible on the menu. Then save* CORTNS.CO *to disk or tape. Thereafter, to run* Scripsit, *don't use* CORTNS.BA. *Just load* CORTNS.CO *and* WRITE.BA; *then run* WRITE.BA.

It's impossible to name one DOS or another as "superior." Each has its own special features, along with its own group of staunch proponents. Even Tandy's FLOPPY *has its uses. (Did I really say that?)*

Thanks for the kind words. Unfortunately, we don't have enough space for bar code listings. Printed listings are more universally accessible to readers, and for those who can't or won't type, there's P100-To-Go *and the* Portable BBS.

-MN

***BASIC*-TO-ROM?**

I would like to know the procedure to put a *BASIC* program into the option ROM socket of the Model 100. For example, to which address must I put the file name? Where must I put the beginning of the program? If my *BASIC* program calls a machine language routine, can I put the routine anywhere in the ROM?

Thank you very much!

Harold Cyr, Ing.
Quebec, Canada

Putting BASIC *programs on ROM is very tricky business, but King Computer Services has released a* BASIC-*to-ROM compiler that handles all the nasty details for you. (See their ad.) I've played with it, and it's great! Even if you choose to "roll your own," they may have the answers you need.*

-MN

WHITHER FAX?

We wish to purchase a computer to receive weatherfax from my ham radio. I've been told the Tandy 102 will do this with a PK-232 interface.

Do you have any information or past articles which would be of any help to me? I'm afraid I know so little about computers that even forming appropriate questions are difficult. Even my ham radio friends don't seem to know about this.

Any information you can share with me will be greatly appreciated.

LaVonne Misner
Mound, MN

The October '88 issue of PICO *has some articles on the subject, which may be of help (see "Portables at Sea," p.10, and "Piloting and Celestial Programs," p. 14). Can anyone else help us?*

-MN

Bar Graphs with *MSPLAN*

As I mentioned a couple of months ago, *MSPLAN* was a major factor in determining the purchase of my Tandy 200. Microcomputer spreadsheet software is about 12 years old, but it has come a long way since it first appeared on the market. Having a spreadsheet in a portable computer has really caught on, and now it's hard to find a portable without one.

A nice feature of many spreadsheets is the ability to present numerical comparisons visually. Sometimes the actual numbers are nothing more than a means to calculate who sold the most product (for example), where the desired result is the comparison rather than the actual figures, a result that might best be conveyed in a graph.

```
   |  1|  2|  3|  4|  5|  6|  7|  8|  9
  1| The Great American Widget Company
  2|
  3|Gadget..xxxx
  4|Whatsit.xxxxxxxxxxxxxxx
  5|Widgit..xxxxxxxxxxxxxxxxxxxxxxx
  6|       -+---+---+---+---+---+---+--
  7|(thous.) 30  38  46  54  62  70  78
  8|----------------------------------
  9|Gadget..  1   0   0   0   0   0   0
 10|Whatsit.  1   1   1   1   0   0   0
 11|Widgit..  1   1   1   1   1   1   0
 12|Gadg---> 33  iv=  8
 13|What---> 58  mn= 33  M1= 30
 14|Widg---> 75  mx= 75  M8= 78
 15|
```

Figure 1. An example MSPLAN *spreadsheet that incorporates the graphing found in the SYLK file in Listing 1. You can change the text and numbers to suit your own needs.*

The Tandy 200 *MSPLAN* does not offer a graph mode but that doesn't mean you can't get the desired output. Listing 1 is the source Symbolic Link (SYLK) file, *GRAPH1.DO*. Enter this file to *TEXT* and load to *MSPLAN* via *F7*, *F2*, and *F3*(SYLK). Call the file *GRAPH1* and after it's loaded to *MSPLAN*, exit *MSPLAN* and save the file *GRAPH1.CO* as a reference file. Now you can go back to *GRAPH1.CO* and experiment. (Note: If you're not familiar with the Tandy 200 *MSPLAN*, then you should consult the manual about loading SYLK files.)

When you enter *GRAPH1.CO* the screen looks like Figure 1. Feel free to modify any cell that contains text, but don't alter any of the formulas. Of course, when applying this to a real application you will likely compare more than just three (3) items. I selected this example so you can view the entire spreadsheet, but normally the lower portion (below line 7)would not be printed or displayed.

THE ACTUAL VALUES TO BE GRAPHED ARE ENTERED TO CELLS R12C3, R13C3, AND R14C3. The values of the markers on the graph legend (line 6) are automatically calculated to present the best view of the numbers. As you alter the numbers to be graphed, the graph reflects the change, and so will the following cells:

R12C5 = (*iv*) interval/legend markers
R13C5 = (*mn*) minimum number to be graphed
R14C5 = (*mx*) maximum number to be graphed
R13C7 = (*M1*) lowest legend number
R14C7 = (*M8*) highest legend number

You can enhance the accuracy of the graph by expanding to 60 or 80 columns (when printed), and even more if you use

Continued on page 32

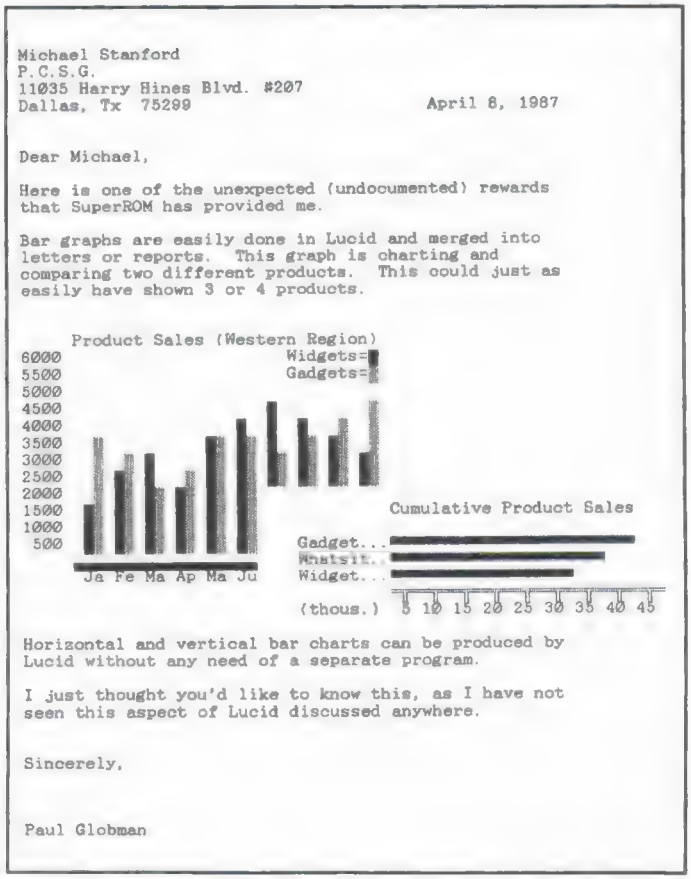


Figure 2. A copy of a letter, printed with a dot matrix printer, which incorporates graphs produced with MSPLAN.

BACK ISSUES!

New low collector edition prices!

In celebration of our first year publishing Portable 100, we've decided to inaugerate the new year by reducing the price of our collector edition, pre-1987 back issues to only **$9.95** each, postage and handling included. The price of issues from August 1987 to present will stay at **$5.00**, postage and handling included.

To help you decide which issues you want, we've put together a special, comprehensive 18-page article index covering every issue published from September, 1983 (premier issue) to the July/August 1988 issue. This index is available for only **$7.00** (includes shipping & handling).

Month	83	84	85	86	87	88
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February						
March			*OUT*		*NOT PUBLISHED*	
April		*OUT*				
May		*OUT*				
June		*OUT*				
July		*OUT*		*OUT*		*combined July/ August Issue*
August						
September	*Premier Issue*					
October		*OUT*		*NOT PUBLISHED*		
November						
December						

Is the issue you want sold out? If so, photocopies of the articles are available. Get the Article Index for details.

- ❑ Send me the Portable 100 Article Index for **$7.00** (P&H included).
- ❑ Please send me the back issues I've indicated above (pre-1987— **$9.95** each; 8/87-on—**$5.00**each; shipping and handling charges included).

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The Portable 100 Classifieds

Services

MODEL 100, 102 200 SUPPORT
International support by mail, voice, and bulletin board (M8N1E). Free on-line weekly newsletter. For your free 5.25" diskette of information and programs, write to: CLUB 100, A Model 100 User Group, 984 Hawthorne Drive, Walnut Creek, CA 94596

Model 600. Programs/Newsletter. Send S.A.S.E. for information. Easy Ware Products; P.O. Box 218778; Houston, TX 77218-8778

Software

By Teachers for Teachers: "Grade Management System" Personalized... Stay organized. You set up to: 12 grade values-9classes-50 students. 3.5-inch disk for PDD. Tandy 100/102, 200. We also customize 5 *BASIC* programs. $49.00+$2.00 (S&H). Software by Steffens', 1731 William Ct., Little Chute, WI 54140.

TRANSFER.COM (Club 100 Special Edition) MS-DOS/Tandy Laptop $9.95 plus $1.00 shipping and handling (Min. $20 for MC or VISA orders; Calif. residents add 6.5% tax).

Easily transfers programs between MS-DOS computers and your Model 100, 102, or 200 laptop with the "special edition" CLUB 100 TRANSFER program. Experience new power and freedom. MS-DOS formatted 5.25-inch disk contains the transfer program, complete documentation and several unique files, including laptop programs not found anywhere. Write to: CLUB 100: A Model 100 User Group, 984 Hawthorne Drive, Walnut Creek, CA 94596.

Run "TRANS-IT" and your PC and turn control over to your laptop—for fast and easy file transfers. Model 100/102/200/600, NEC laptops and many more. All transfers are done from the laptop's keyboard. Requires standard null modem cable, also available. TRANS-IT, $39.95 (specify 5.25-inch or 3.5-inch disk. Null modem cable—$12.50. Selective Software Company, P.O. Box 91723, East Point, Georgia 30344. Orders shipped by return mail.

Hardware

For Sale-Best offer: Two M-100's 128K, also Tandy Drive 1, programs, accessories, and complete M-100 magazine collection. Call 305-432-7588

Wanted-Tandy 100K PDD One, Catalog #26-3808. H. Hendrix; 906 So. Viola; Milbank, SD 57252; 605-432-6548

Model 100 (32K) with backlit screen and SuperROM, Chipmunk disk drive with software. Total system price $650. Call 312-351-3737. Ask for Steve or Bob.

The "POWER PILLOW"™ by Club 100. $19.95 assembled/$14.95 kit plus $2.00 shipping and handling (Min $20 for MC/VISA; Calif. residents add 6.5% tax).

Never commercially advertised outside of CLUB 100 until now. The secret to long-lasting power is now available to non-club members. Get the convenience and power of 4 "D" cell batteries and a leather-like look. Easily powers all 6v-DC laptops and peripherals. Customizing tips included. Write to: CLUB 100: A Model 100 User Group, 984 Hawthorne Drive, Walnut Creek, CA 94596.

HOW TO PLACE A CLASSIFIED AD

Categorize your advertisement (Hardware, Software, Services, Wanted, Etc.) and carefully type your message. We are not responsible for correctly interpreting handwritten advertisements. Phone numbers, street numbers, dimensions, and any abbreviations count as one word. Logos, company or product, are not allowed, neither are display advertisements. Business rates are $1.60 per word; non-business rates (individuals advertising) are $1.30 per word. Add up the cost and send the advertisement copy with a check, money order, Visa, or Mastercard number to: Portable 100 Classifieds, 145 Grove St. Ext., P.O. Box 428, Peterborough, NH 03458-0428, c/o Linda Tiernan. Make checks payable to Portable 100 Classifieds. Include your complete return address and phone number (phone number is printed only if it is included in the advertisement itself). Materials due the 1st of the month, two months prior to the magazine cover date (example: materials for the February issue must be received by December 1st.) Advertisements received after the deadline will appear in the next scheduled issue. Payment must accompany order. No refunds for advertisements that miss deadlines, regardless of reason. We reserve the right to change advertisement categories, and to reject, edit, or cancel any advertisement we deem improper. There are no agency discounts for classifieds. **For faster service call 603-924-7949.**

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B;Y14;X9
C;Y1;X1;K" The"
C;X2;K" Gre"
C;X3;K"at A"
C;X4;K"meri"
C;X5;K"can "
C;X6;K"Widg"
C;X7;K"it C"
C;X8;K"ompa"
C;X9;K"ny  "
C;Y3;X1;K"Gadg";G
C;Y9;S;R3;C1
C;Y12;S
C;Y3;X2;K"et..";G
C;Y9;S;C2
C;Y3;X3;EIF(R[+6]
  C=1,"xxxx",
  "    ");D;K
  "xxxx"
C;X4;S;C3;K"    "
C;X5;S;K"    "
C;X6;S;K"    "
C;X7;S;K"    "
C;X8;S;K"    "
C;X9;S;K"    "
C;Y4;X3;S;K"xxxx"
C;X4;S;K"xxxx"
C;X5;S;K"xxxx"
C;X6;S;K"xxxx"
C;X7;S;K"    "
C;X8;S;K"    "
C;X9;S;K"    "
C;Y5;X3;S;K"xxxx"
C;X4;S;K"xxxx"
C;X5;S;K"xxxx"
C;X6;S;K"xxxx"
C;X7;S;K"xxxx"
C;X8;S;K"xxxx"
C;X9;S;K"    "
C;Y4;X1;K"What";G
C;Y1Ø;S;R4;C1
C;Y13;S
C;Y4;X2;K"sit.";G
C;Y1Ø;S;C2
C;Y5;X1;K"Widg";G
C;Y11;S;R5;C1
C;Y14;S
C;Y5;X2;K"it..";G
C;Y11;S;C2
C;Y6;X3;K"-+--"
C;X4;ERC[-1];D;K
  "-+--"
C;X5;S;R6;C4;K
  "-+--"
C;X6;S;K"-+--"
C;X7;S;K"-+--"
C;X8;S;K"-+--"
C;X9;S;K"-+--"
C;Y7;X1;K"(tho"
C;X2;K"us.)"
C;X3;ER[+6]C[+4];
  K3Ø
C;X4;ERC[-1]+R12C5;
  D;K38
C;X5;S;R7;K46
C;X6;S;K54
C;X7;S;K62
C;X8;S;K7Ø
C;X9;S;K78
C;Y8;X1;K"----";G
C;X2;S;R8;C1
C;X3;S
C;X8;S;KØ
C;X9;S;KØ
C;Y11;X3;EIF(R14C3>
  R[-4]C,1,Ø);D;K1
C;X4;S;R11;K1
C;X5;S;K1
C;X6;S;K1
C;X7;S;K1
C;X8;S;K1
C;X9;S;KØ
C;Y12;X2;K"--->"
C;X3;K33
C;X4;K"iv="
C;X5;EINT((R[+2]C-
  R[+1]C)/6)+1;K8
C;Y13;X2;K"--->"
C;X3;K58
C;X4;K"mn="
C;X5;EMIN(R[-1]C[-2
  ]:R[+1]C[-2]);K33
C;X6;K"M1="
C;X7;EINT((RC[-2]-
  1)/5)*5;K3Ø
C;Y14;X2;K"--->"
C;X3;K75
C;X4;K"mx="
C;X5;EMAX(R[-2]C[-2
  ]:RC[-2]);K75
C;X6;K"M8="
C;X7;ER13C7+6*R12C5
  ;K78
E
```

Listing 1. The SYLK file for an MSPLAN *spreadsheet that produces bar graphs.*

compressed printing. Of course, you have to adjust some formulas as you add lines and/or columns to the spreadsheet.

To best understand the workings of the program, study the formulas in the cells and see how the changing of the input data applies to the final display. I originally developed this graph technique with SuperROM and had rewritten it for *MSPLAN*. Figure 2 is a reduction of a letter printed with an EPSON (IBM compatible) dot matrix printer, a Tandy 200, and SuperROM. Quite a combo!

by Paul Globman

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For free information on products advertised in this issue of Portable 100, locate the Reader Service number corresponding to the advertisement that interests you. Circle the number on the Reader Service Card at page 25 (or on the wrapper protecting the magazine if you are a subscriber) and drop it into the mail. The literature you've requested will be forwarded to you without any obligation. Please allow 3-5 weeks for delivery.

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